Mining CONGRESS JOURNAL

THE AMERICAN MINING CONGRESS

APRIL
1945

MEMO
TO THE MINING INDUSTRY

When vital electrical equipment needs reconditioning or repair... Call for

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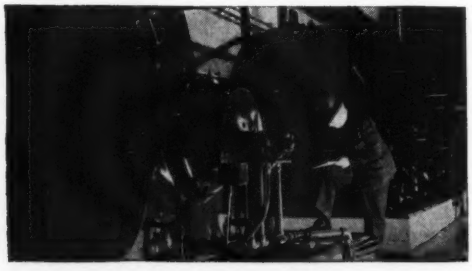
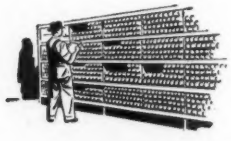
FACTORY PROVED

MAINTENANCE SERVICE

34 MODERN REPAIR PLANTS—These plants are fully equipped to handle repairs on any electrical equipment, which is not too large to be moved. Equipment includes special apparatus for High Frequency Testing, Dynamic Balancing, Metal Spraying, Phos-Copper Brazing, etc.



12 ENGINEERING AND SERVICE OFFICES—Factory-trained engineers are available to diagnose trouble, and work with your own engineers to speed up repairs. Portable field equipment assures accurate results.



17 RENEWAL PARTS WAREHOUSES — Conveniently located warehouses can give you prompt service on genuine Westinghouse renewal parts. A Maintenance Engineer is available to discuss any of these problems with you.

A Local Service for the Mining Industry

Whenever you need major electrical repairs in your plant—or repair and overhaul of equipment outside your plant—call Westinghouse. A nationwide maintenance organization, with local branches as close as your telephone, is ready to help you get apparatus back on the job in the shortest possible time.

This service offers 3-way flexibility to meet your needs: (1) *A Local Repair Plant*—completely equipped to handle repair and reconditioning of motors, generators, controls, transformers, etc. (2) *Field Engineering and Service* to handle major repair or overhaul jobs right in your plant. (3) *Renewal Parts Warehouses* to give you prompt service on genuine Westinghouse replacement parts.

To obtain any of these services, just phone your nearest Westinghouse Sales Office for a Maintenance Engineer.

J-96005

WHAT "FACTORY-PROVED" MAINTENANCE MEANS

This tag, attached to every repair job handled by Westinghouse, means that the work has been handled according to rigid factory standards. "Factory-Proved" methods and materials have been employed; the apparatus has been tested according to factory specifications; repairs on the apparatus carry the standard Westinghouse guarantee. This means better, longer-lasting repairs.

WESTINGHOUSE

Westinghouse

PLANTS IN 25 CITIES ... OFFICES EVERYWHERE

RENEWAL PARTS—ENGINEERING SERVICE—REPAIRS

Mining CONGRESS JOURNAL

Contents

VOLUME 31, NUMBER 4 FOR APRIL 1945

★ ★ ★

FRONT COVER: Harry M. Williamson & Son fluorspar mine near Jamestown, Colorado. 7,200-ft. elevation, 100 tons per day output.

PHOTO, CATERPILLAR TRACTOR CO.

Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress.

THE AMERICAN MINING CONGRESS

309 MUNSEY BLDG., WASHINGTON 4, D. C.

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ABC

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FOUR STAR PERFORMANCE

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In the battle to keep Old Glory flying, the Union Wire Rope organization is proud of winning the Minute Man flag and the Navy E Burgee with four stars signifying the limit of renewals for maintained excellence in war production. With war-sharpened skill our organization is determined to render four star performance in the service of private industry postwar. In the meantime, our current advertising funds are devoted to furtherance of sound plans offering full opportunity for competitive private enterprise to survive and expand on a sound foundation.

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...ABOUT FACE!

About faced, the forces that generated the world's miracle of production can rebuild the economy, make jobs, combat inflation and postwar slump. To do this, however, private industry must have freedom of enterprise stimulated by fair and honest competition. To have this, private industry must see to it that sound plans are first made, then carried out without becoming hamstrung.

For example, legislation for a highway program has been passed by Congress. It calls for a great highway system to be built by efficient contract competition. Most states are far from ready to meet its requirements which call for completed, approved plans before contracts can be let. Definite action is being taken by many responsible officials, but it is a big job and every cooperation should be given them so that time will not be lost because of unprepared plans. Important information on this subject is available in the book "The Road Ahead" published by the American Road Builders' Association, Washington, D. C. It should be read by every person interested in keeping America the land of opportunity. Check the coupon for a copy of this book and send today.

Another project vital to the national economy is developing. The Civil Aeronautics Administration report to Congress included a plan for national airport development. "Put Your Town on the Air Map" is the title of a book published by the Aeronautical Chamber of Commerce of America, Inc., Washington, D. C. Check the coupon below for this book and send today.

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Honorably Discharged

after 19 years of faithful service

The Dresser Coal Mine of the Walter Bledsoe and Company, Terre Haute, Indiana, recently initiated a retirement program to *honorably discharge* 243 "Timken Bearing Equipped" mine cars which had been in constant operation for almost 19 years. Yet, even after these years of hard service practically all of the original Timken Bearings are still in excellent condition.

These oldtimers which were designed and built by American Car and Foundry Co., Huntington, W. Va., performed so efficiently 225 new "Timken Bearing Equipped" cars were manufactured by them recently for the Dresser Mine.

Mine operators everywhere today enjoy the advantages of faster train speeds, greater tonnage hauls, lower power consumption, simple and economical lubrication and greatly reduced maintenance because their cars roll on Timken Bearings. If you are not yet one of these satisfied operators it will pay you to investigate the advantages of Timken Bearings without delay. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

How Raw Coal is Blended at Praco Preparation Plant

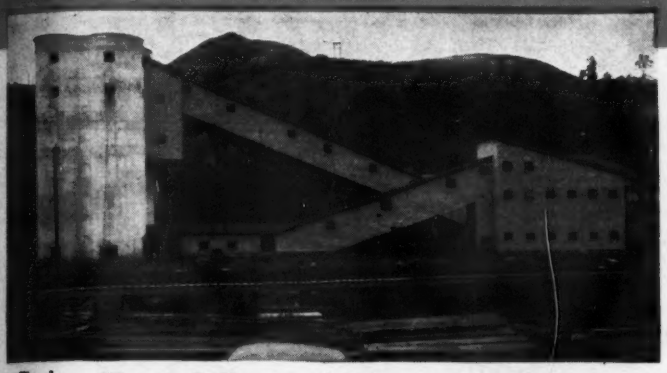


Fig. 1.

Nested System Adaptable To Either Layer or Spot Loading

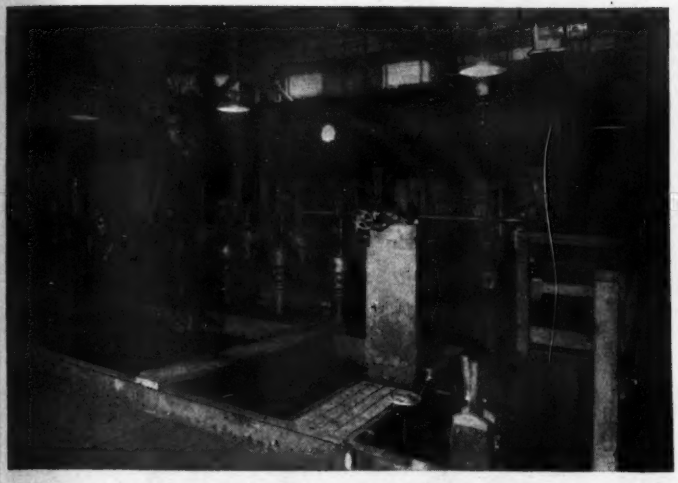


Fig. 2. General view of washing floor showing Link-Belt air-pulsated washing unit for cleaning 5" x 7/16" steam coal.

Fig. 3. General view of complete Link-Belt Preparation Plant for steam and metallurgical coal. From left to right are shown the mine-run storage and blending silos, a primary cleaning and crushing house, refuse bin feeding to two belt conveyors up the hill, and, at the right, the preparation sections.

● R.O.M. coal from three mines in the widely variable Mary Lee seam is blended prior to washing at Alabama By-Products Corp.'s new Link-Belt preparation plant. Four concrete silos with a combined capacity of 1000 tons, comprise the blending-storage bins. These reserve storage facilities also permit of greater flexibility and maximum economy between mining and preparation shifts.

The system employs a minimum of mechanical equipment with a consequently lower initial cost. It reduces segregation and improves uniformity in sieve, moisture and chemical characteristics of the raw coal.

Raw coal from the dump hopper is carried by belt conveyor to a swiveling chute at the top of the silos. (Fig. 1). This chute is oscillated back and forth over each silo as it feeds, with the coal from each trip of cars going to a different silo. Operation of the chute is controlled by the dump house operator.

Since coal from different sections of the mine radically differs in sieve and chemical analyses, the coal deposited in each silo is of different quality, sieve analysis and moisture content. Feeders at the bottom of each silo feed simultaneously to a belt conveyor, which delivers to the preparation plant. In this manner the entire mine production of coal is blended.

This blending of the feed accomplishes two important results in washing:

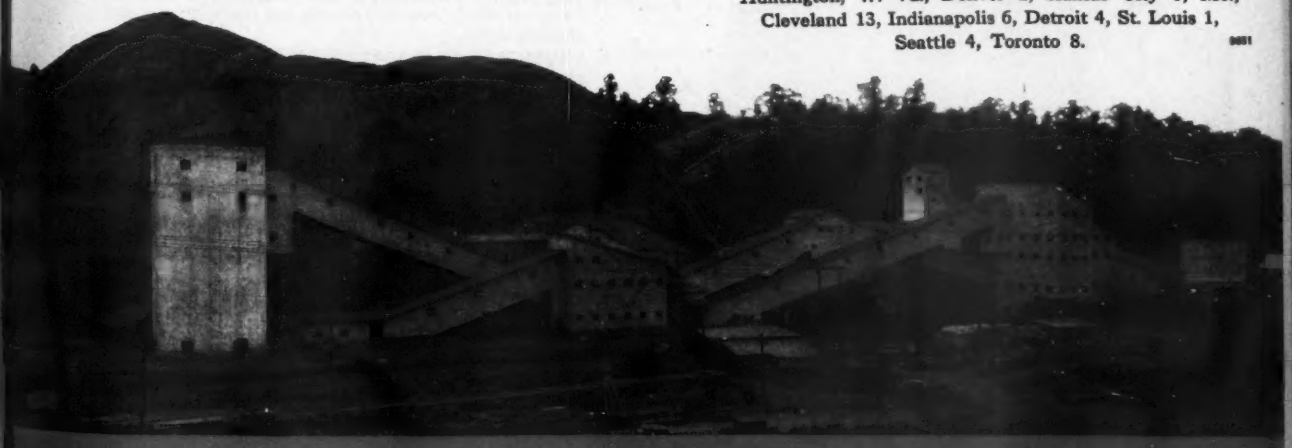
(1) The feed rate is constant, permitting greater operating efficiency of the washery.

(2) The washed coal product is therefore more uniform with respect to both ash and sulphur contents.

Why not gain these advantages for your output by incorporating blending into your flow sheets? Link-Belt's wide and varied experience and facilities are available to you.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8. 9051



LINK-BELT HANDLING PREPARATION EQUIPMENT

More real WITH Thor

POWERFUL ROTATION AND HOLE BLOWING SPEED DRILLING IN ALL KINDS OF ROCK

Dual-Power operation to provide stronger rotation and exceptional hole-cleaning ability is the secret of Thor Drifter's more footage performance and one of the reasons for their extra drill speed.

Extra-heavy rifle bar assembly and positive-set ratchet action, plus balanced power piston action insures dependable rotation to deliver a fresh cut with every blow for rapid advance into the hardest rock.

The exceptional hole-cleaning ability of Thor Drifters adds still further to the penetration rate. Thor design applies a constant jet of air and water at the drill point; provides an extra blast of air when really needed to keep the hole perfectly clean at all times. The many other modern features of Thor Drifter construction—automatic lubrication—low air consumption—minimum vibration all serve to make Thor your best bet for fast, low cost drilling.

INSIDE STORY OF THOR POWER-FEED

1. **THE THOR POWER-FEED** has an independent balanced rotary air motor mounted directly and rigidly on rear end of guide shell.
2. **A SUBSTANTIAL PLANETARY GEARING** transmits the power from rotor directly to feed screw.
3. **ROTOR** is perfectly aligned with feed screw by means of splined driving unit. The entire mechanism is totally free from shock and thrust.
4. **BALL AND ROLLER BEARINGS** throughout.
5. **ENTIRE POWER-FEED UNIT** is completely sealed against dirt.
6. **ONE SIMPLE THROTTLE VALVE** controls all feeding functions—(1) Rapid Return (2) Neutral (3) Slow Drilling (4) Fast Drilling and (5) Rapid Advance.
7. **SUBSTANTIAL COIL SPRINGS** mounted at each end of shell eliminate shock of drill in extreme forward or rear positions.

footage for less money
DRIFTERS!

REASONS WHY!

THOR POWER-FEED DRIFTERS SPEED THE DRILLING CYCLE

1. Eliminate Hand Cranking
2. Gives Greater Drilling Performance
3. Reduces Dead Time—Cuts Costs
4. Greater Freedom for Operator
5. Simple to Operate
6. Quicker Steel Changes
7. Extremely Low In Operating Cost
8. Speed of Feed is Semi-Automatic

Types—Sizes—Styles for all forms of work. The Thor drifter line includes a heavy duty and a medium duty rock drill. Either one of these drifters can be supplied with a hand or (power-feed, described on the opposite page.)

THESE FEATURES MEAN POWER FOR SPEED IN ALL THOR DRIFTERS

MEASURED AIR—The Thor short-travel tubular valve controls air input to .00025"—positive action gets full measure of power from ALL the air.

BALANCED POWER—Precise control of air input provides a full cushion of live air at both ends of piston stroke for fully balanced—full-power performance.

SMOOTH OPERATION—Every stroke is powered by the same measured quantity of air for smooth, uniform operation.

For a complete description of Thor sinker, stoper, and drifter rock drills, write for catalog No. 42A

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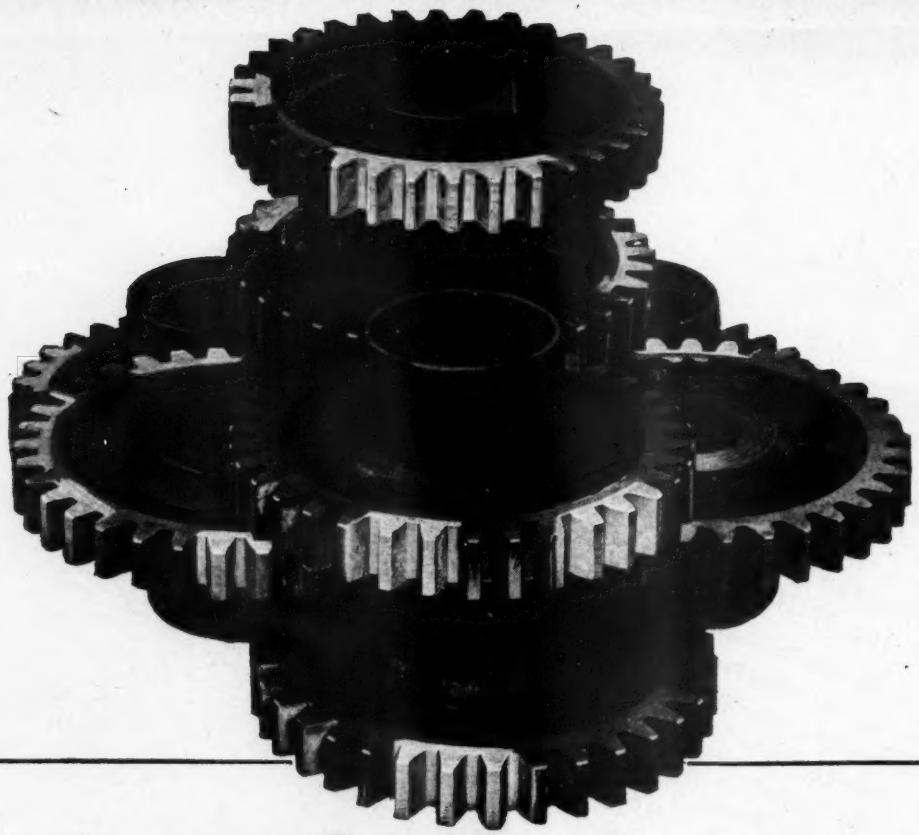


Spare Gears... Tobin Bronze Welded

eliminate down-time on war jobs

READY TO GO to work again, this group of worn and broken gears from wire braiding machines at the Metal Hose Branch of The American Brass Company, were quickly and economically reconditioned with Tobin Bronze* Welding Rod.

Through the use of these spare gears, the machines were kept in operation 24 hours a day on vital war work, braiding wire over flexible metal tubing for ships, tanks, aircraft and landing craft.

"Don't Scrap It... Bronze Weld It!" is more than a slogan—it's a NECESSITY in many plants. Publication B-13 describes Anaconda Welding Rods, suggests uses and procedures. Write for a copy. 45109

*Reg. U. S. Pat. Off.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

ANACONDA

BUY WAR BONDS... Buy All You Can... Keep All You Buy!

Anaconda Bronze Welding Rods

H

Model H Cummins Diesels, 4⅛" x 6", four or six cylinders, develop their maximum 100 and 150 hp., respectively, at 1800 rpm. Designed for—and proved in—various types of wheel and track-mounted equipment and stationary applications.

NH

Series NH-600 and NHS-600 (supercharged) Cummins Diesels, 5⅛" x 6", develop maximum 200 and 275 hp., respectively, at 2100 rpm. Both are six-cylinder, dual valve engines . . . similar in design, weight and dimensions to the Model H. Automotive and industrial models.

L

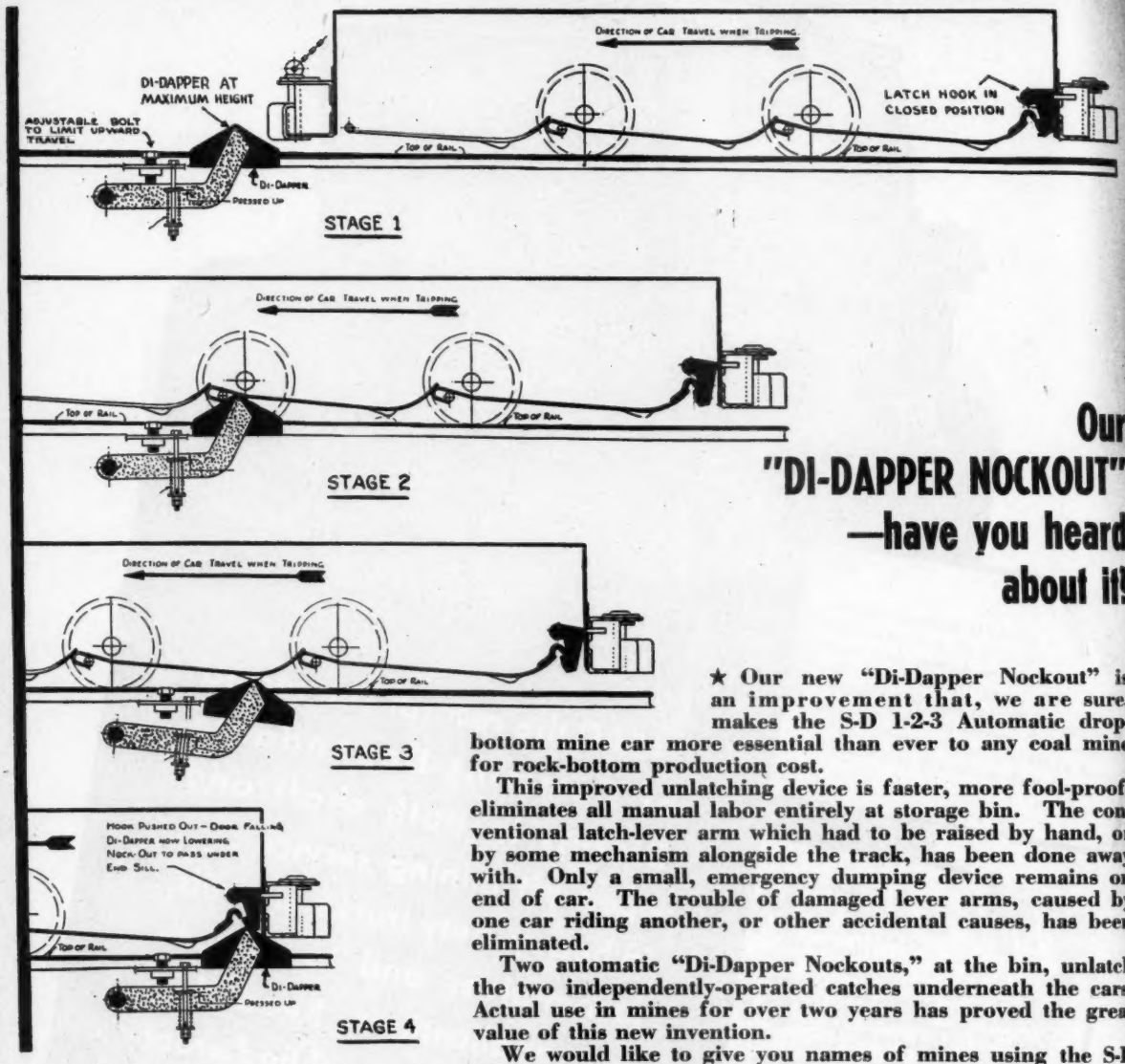
Model L Cummins Diesel, 7" x 10", six cylinders, develops maximum 250 hp. at 1000 rpm. This heavy-duty, medium speed engine is designed for shovels, draglines, cranes, locomotives, etc., and for stationary applications and generating service.

READ the record! The record of Cummins Dependable Diesels in both shaft and open pit mining service . . . in heavy-duty trucks, shovels, locomotives and in stationary applications. Read that record and you will find proof that Cummins-powered means "powered for profit."

CUMMINS ENGINE CO., INC., Columbus, Ind.

CUMMINS DIESELS

SINCE 1919...PIONEER OF PROFITABLE POWER THROUGH HIGH-SPEED DIESELS



Our "DI-DAPPER NOCKOUT" —have you heard about it!

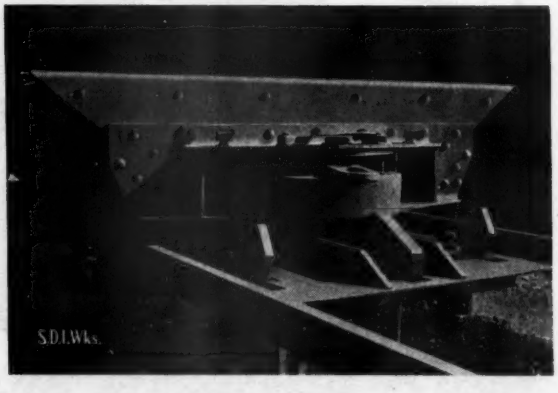
★ Our new "Di-Dapper Nockout" is an improvement that, we are sure, makes the S-D 1-2-3 Automatic drop-bottom mine car more essential than ever to any coal mine for rock-bottom production cost.

This improved unlatching device is faster, more fool-proof, eliminates all manual labor entirely at storage bin. The conventional latch-lever arm which had to be raised by hand, or by some mechanism alongside the track, has been done away with. Only a small, emergency dumping device remains on end of car. The trouble of damaged lever arms, caused by one car riding another, or other accidental causes, has been eliminated.

Two automatic "Di-Dapper Nockouts," at the bin, unlatch the two independently-operated catches underneath the cars. Actual use in mines for over two years has proved the great value of this new invention.

We would like to give you names of mines using the S-D "Automatic" and the "Di-Dapper Nockout." Write us for them and let the operators, themselves, tell you the details.

★ *The drawings above illustrate the S-D automatic Di-Dapper Nockout mechanism as it passes under a S-D 1-2-3 Automatic Drop-Bottom Car having three doors. Stage 1 shows the Di-Dapper mechanism just before the forward bumper depresses it. Stages 2 and 3 show the mechanism passing gently underneath car at different points. At Stage 4, the mechanism automatically rises (by the action of compressed spring) to a point where it engages the forward faces of the door-supporting latch hooks. Each car has two such mechanisms, and each mechanism automatically comes into contact with one of the latch hooks and forces it back positively into its unlatched position. Photo at right shows car just after it has passed over Di-Dapper Nockout mechanism.*



Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

How We Keep A Fast Crowd In Line

Here's a *fast* crowd that doesn't give trouble--not the way P&H builds it!

It's plain to see why the crowding action of P&H Electric Shovels is so much livelier — more responsive and powerful. Conical worm gear drive cuts inertia to a minimum — permits the most compact gearing unit possible. Only very short shafting is required; overhung gearing is eliminated. Every ounce of power from the independent crowd motor flows smoothly to the dipper sticks for *snappier* crowding — *faster* retracting.

P&H engineers increase the advantages of the compact, flood-lubricated gear case design by building it integral with the boom. Welded-in construction adds to boom rigidity and strength, while integral shipper shaft housing prevents bearing movement and torque on the boom. The net result in any open-pit operation is bigger and steadier production.

This faster, more dependable crowd is another example of the advanced engineering and simplified design that mark the new P&H Electric Shovels as the greatest forward step in electric shovel history. Behind them is P&H's 60-year leadership in applying electrical power to the movement of heavy loads.

P&H

ELECTRIC SHOVELS

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THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT

HERE'S HOW TO GET

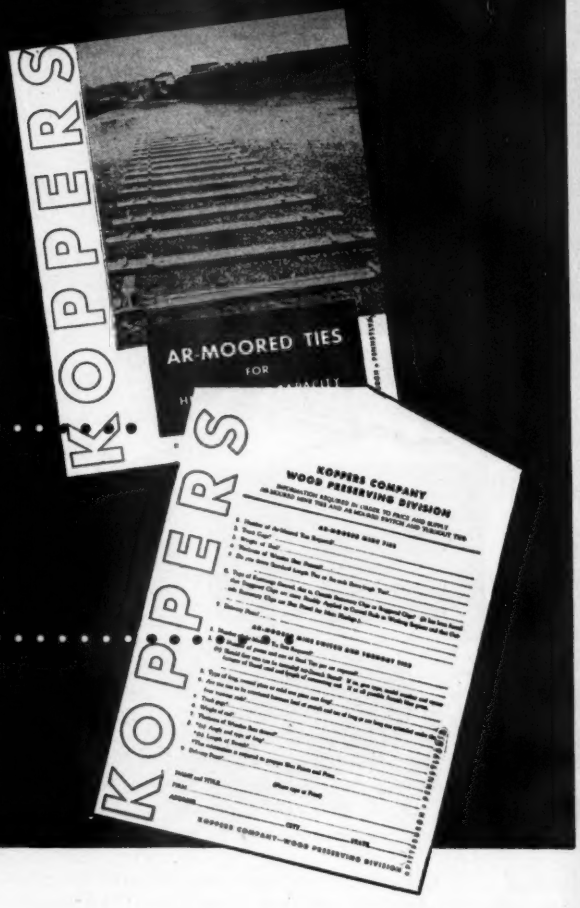
full information

ON

AR-MOORED* TIES

GET THIS 8 PG. BULLETIN
FOR THE
GENERAL STORY

FILL OUT THIS "SELF MAILER"
INQUIRY FORM
FOR A DEFINITE PROPOSAL



No matter how busy you are—now you can afford the time to get full information on Ar-Moored Ties. The 8-page picture bulletin condenses the story into a few minutes of reading. And with the new Inquiry Form you can note down all the facts needed to get a definite proposal and prices with a few strokes of the pen.

Ar-Moored Ties are composed of a standard steel mine tie securely anchored to a pressure-treated, pre-formed wood base. Gauge is accurately established and permanently maintained. Ties can be repeatedly re-used as sections are worked out; some customers have reported as many as fifty re-layings with no sign of depreciation. One customer estimates that his Ar-moored ties will be lifted and re-used 27 times in a 12-month period alone . . . and that they will *have paid for themselves in only 7 months time.* Ask for the bulletin and for the new inquiry form.

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Buy More War Bonds—
and Keep Them!

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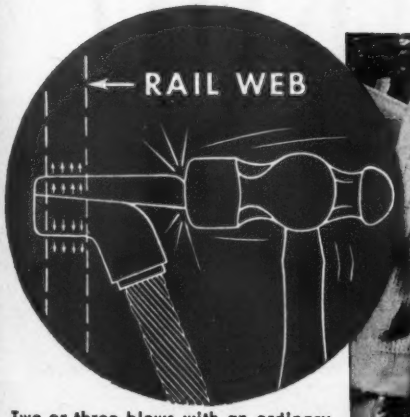
THE INDUSTRY THAT SERVES ALL INDUSTRY

EAT YOUR CAKE and have it, too!

You can install more Rail Bonds per hour and STILL do a BETTER bonding job with O-B Wedge Bonds



Two or three blows with an ordinary hammer develop 20,000 lbs. expansion pressure—effectively "cold-welding" the Wedge Bond terminal to the rail—forming a perfect, permanent mechanical and electrical joint.

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A few seconds Mobildrilling time . . . a few hammer blows . . . That's all that is required to apply O-B Wedge Bonds.

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- ***More simple to reclaim . . . .***
- ***Yet absolutely dependable!***

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SPECIFY O-B WEDGE BONDS
FOR UNIFORM RETURN CIRCUIT CONSTRUCTION

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Only when U. S. Royal Cords and Cables have thus been tried and tested...only when they have been tried, too, by heat, cold, impact, compression, and bend are they offered to you under the "U.S." seal—and denoted "Safety Tested".

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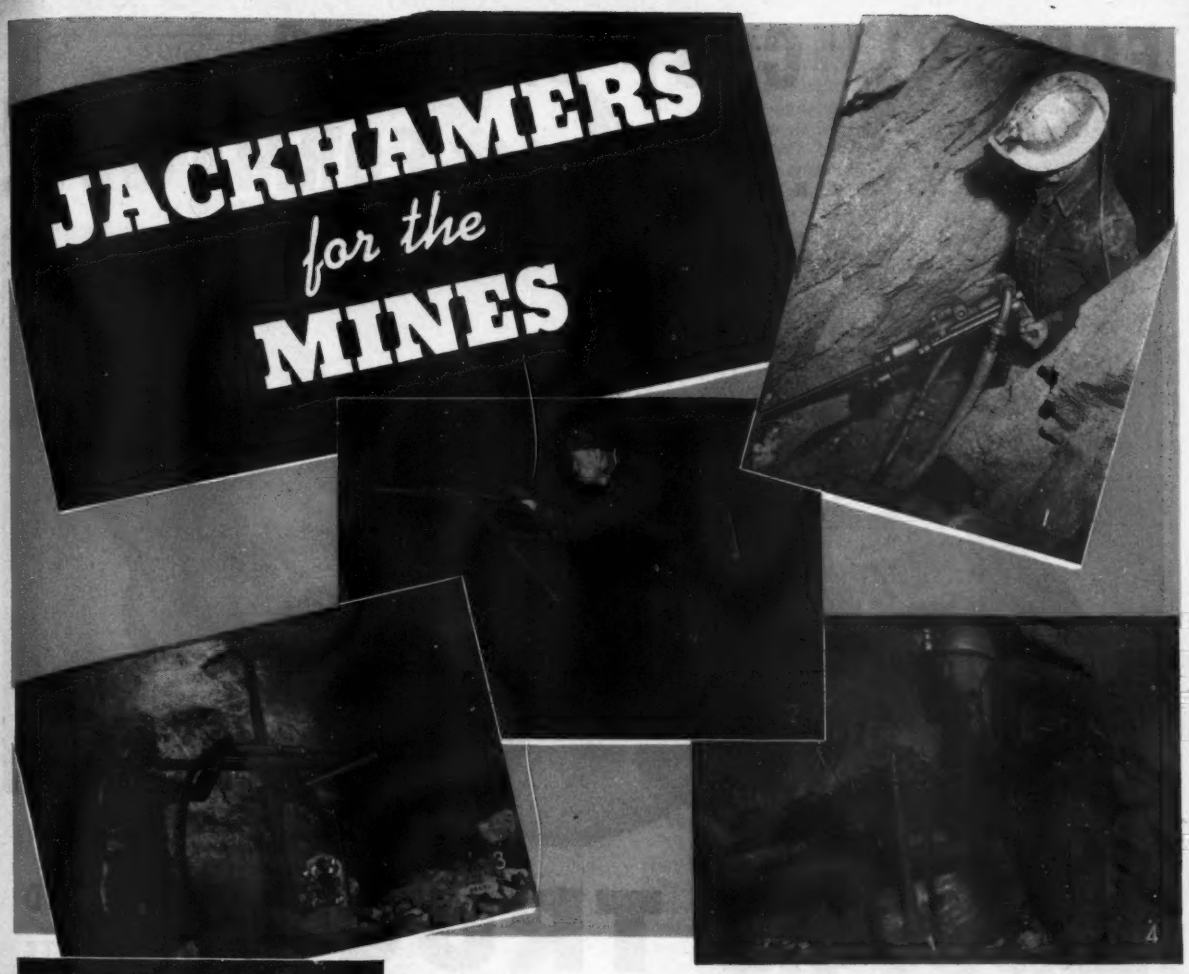
JACKHAMERS *for the* MINES



All five sizes* of Ingersoll-Rand Jackhamers are outstanding performers. There's a machine for every job. Fast drilling, ease of handling and ability to stand up under hard use have made them general favorites with drill operators and owners everywhere.

The fine performance of these machines is backed by Ingersoll-Rand's experienced service organization. This group of men will not only give advice on how you can get the most out of your rock drills, but they can also help you select the best machine for your conditions.

• • • • •

1. A JB-5 Jackhamer in a metal mine. This machine is famous for "Easy Holding" and low upkeep.
2. This simple air-feed Jackleg mounting makes the drilling of horizontal holes easier and increases footage — in some cases as much as 50%.
3. Jackbits are used with this machine to further increase footage and efficiency.
4. This miner is driving a crosscut with a JB-5 Jackhamer and a JM-114 mounting.
5. In this western lead mine, the miner is taking up bottom with a JB-4 Jackhamer in a room-and-pillar stope.

***A JACKHAMER FOR EVERY JOB**

Model	Weight Class
JB-30	30 lb.
JA-35	35 lb.
JB-4	45 lb.
JB-5	55 lb.
X-59	80 lb.

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Specify TRUCO DIAMOND DRILL BITS

Whatever the type of drilling you are doing, whatever the formation, try a TRUCO Diamond Drill Bit *engineered to your job* . . . and see the difference!

You'll notice the difference in faster drilling speeds, in cleaner and truer cutting, in longer performance, in lower labor and footage costs. These advantages are due to TRUCO'S scientific design; fine quality, carefully selected diamonds; a matrix of TRUCO patented metal with its high resistance to abrasion; and the ability of TRUCO Bits to stay on the job longer and to avoid breakdowns which necessitate superfluous rod pulling. And when resetting becomes necessary, you'll notice another money-saving advantage in the fact that TRUCO Bits are designed to provide exceptionally high diamond recovery.

Whether your drilling calls for coring, blasting, pilot or casing bits, you'll find in the complete line of TRUCO Drill Bits the correct size and type for your job. Specify TRUCO and you'll get real money-saving performance

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Mining
CONGRESS JOURNAL

Published for the Entire Mining Industry by The American Mining Congress
S. A. TRENGOVE, Editor

Volume 31 APRIL, 1945 Number 4

High National Income

THERE are two ways (nowadays) of creating adequate national income. Time was, when we had only one. Remember? That was when private enterprise was considered the only legitimate source, and before the New Deal began to frame tax programs in terms of "what will lose the fewest votes."

The fiscal medicine men, with appropriate beating of tomtoms, and heedless of the effect on private initiative, have added a second way and now do the job simply by creating, through deficit financing, enough purchasing power to inflate the national income to the desired level.

The current shouting and confusion over this problem is either based on ignorance or is designed purely for psychological effect. It takes the form, for example, of emphasizing an assumed post-war national debt of $300 billion or more, setting up an employment goal of 60,000,000 or higher and dragging out the old bogey of unemployment and distress in the 1930's. All of which confounds the public mind—and sets up signposts on "the road to serfdom."

The higher the national debt, the higher the interest payments needed, and thus we start off on budget estimates with a high fixed figure which will have to be met each year. This helps the "planners" create a "what's the use" psychology and tends to reduce the taxpayers' resistance to high budget figures.

Current overestimates on job requirements have a similar effect. "Full employment" may be easily used for certain propaganda purposes definitely contrary to general welfare. With actual needs estimated by sound economists at 50-55,000,000 we are more than a wee bit suspicious of the purposes of the higher figures. Maybe later on we'll be able to detect a "job scarcity" useful to the advocates of "planned economy."

An answer to the "1930 bogey" may lie in the presently attained bulwark of unemployment and old age reserves now exceeding some $6 billion apiece and each being incremented at nearly $1.5 billion yearly. It is suggested that, if we have faith in the social security system, part of these reserves be considered available to carry us over the expected "hump" of reconversion, rather than to further jeopardize prospects of reduced taxation with the incentive it offers to private initiative.

"A large national income," says Dr. Harley L. Lutz, Professor of Public Finance, Princeton University, "is an indication (not a cause) of general prosperity; the sure and safe way to get it is by restricted Federal spending and moderate taxation rather than by huge budgets supported by heavy taxes or by inflation-creating deficits." Dr. Lutz and others have set up tax budget assumptions ($13-$15 billion) which include all of the necessities and which they see as supportable by income from private enterprise. Government estimates run $5 to $10 billion higher, some even reaching $30 billion. "A national income created by the process of thrift, investments, work and venturesome planning will be tough-fibered and resilient, capable of supporting all reasonable needs of Government under moderate taxation." Conversely, "both logic and experience indicate that a steady undermining of the public credit through continued large deficits is a menace to enterprise."

The "planners" have set up a prize dilemma—high income permits collection of high taxes but a high levy, especially at severe rates, will tend to depress income by curbing the forces which have built it up.

We'd better turn the job of creating high national income back to private initiative!

Mine Supervisors ARE Management

THE recent decision of the National Labor Relations Board in the Packard Foremen's Union case leaves us unmoved in our long-held opinion that *since the full responsibility for the safe and efficient operation of our mines rests squarely on the shoulders of the mine supervisory officials, these men are management in every sense of the word!* We hold that from the top executive down to the initial grade of foremanship the only real difference in jobs is in the degree and kind of responsibility.

Traditionally every mine foreman or sub-foreman is a potential assistant superintendent, superintendent or higher official with responsibility for the success of the enterprise. It is unthinkable that these men should become embroiled in the innumerable bickerings and pressures to which they would be subjected as members of a union, especially in view of the inherent bond which would exist with the members of rank and file unions for whose safety and direction they are responsible.

Of greater significance than other questions in the Packard case, as stated by Leo Wolman, "is the majority opinion's attitude toward two central issues of national labor policy—the separation of function between supervisor and supervised and the interpretation of the policy of the Wagner Act.

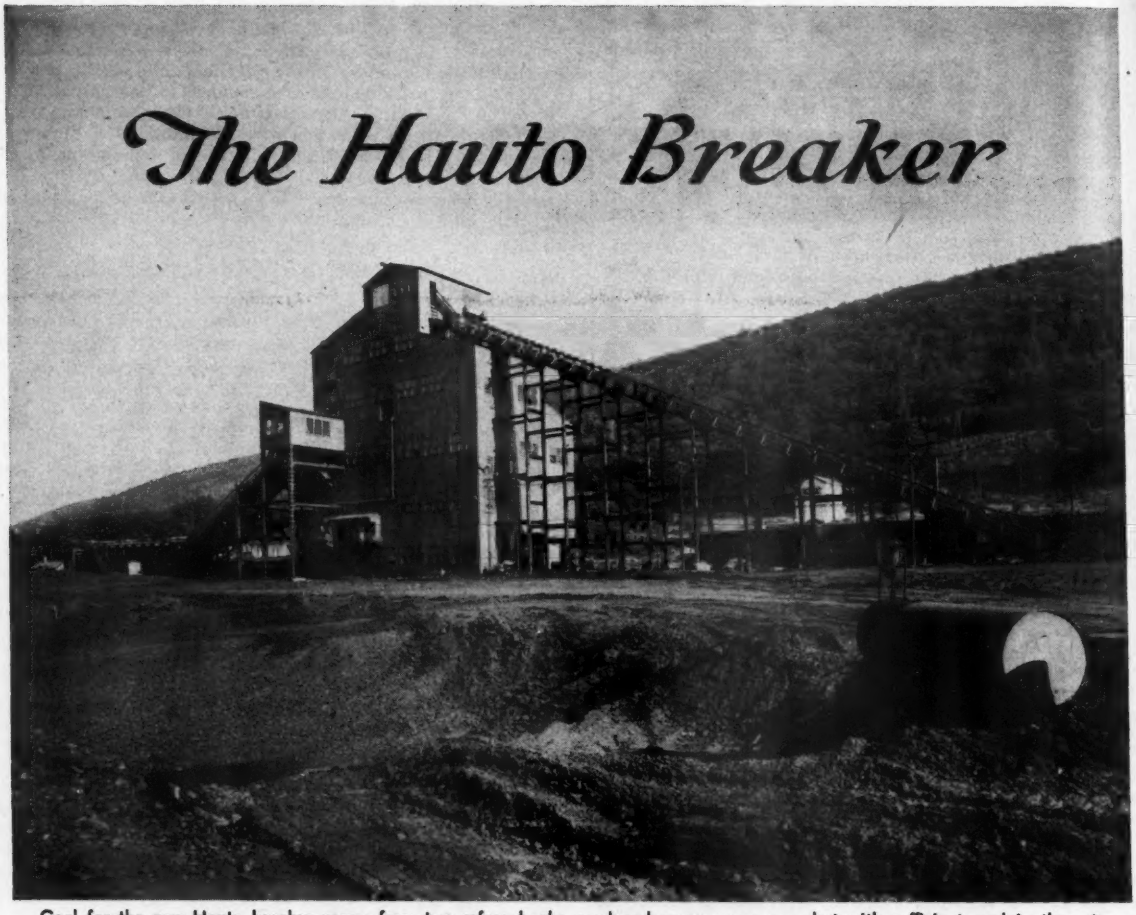
"The first question the board disposes of by its finding that foremen have no authority and by the assurance that foremen's unions are independent of the unions of employes and will remain so. But as to the independence of foremen's unions, the board is reckoning without John Lewis and his UMW."

Gerard D. Reilly, dissenting member of the Board, shows that "in order to prevent its strikes from being broken, the Foremen's Association of America, . . . though nominally independent" resorted "to treaties of mutual aid and assistance with rank-and-file unions. In response to a question . . . counsel for the petitioner admitted . . . that 'when the foremen struck there was a direct and express agreement between us and the CIO leaders that members of the CIO . . . union would not be permitted to take the place of foremen'." Mr. Reilly hits the nail on the head with this concrete example of "separation of function" in actual practice.

The second issue deals with the purpose of the Wagner Act. The majority opinion of the Board laid emphasis on the fact that there had been strikes, apparently assuming that recognition would avoid strikes in the future. Mr. Reilly, however says, "our own files show that in most of the strikes which have occurred in wartime, the organizations involved were unions to which orderly procedures of this Act were available." If strikes impede the war effort, "a wiser remedy would be legislation conferring upon this Board the same powers to invoke judicial process against recalcitrant labor organizations which it now possesses with regard to disobedient employers."

Mr. Wolman, discussing the harm to the genuine interests of both industry and labor wrought by the "reckless and irresponsible" decision in the Packard case concludes, "A good deal of blame for this condition may also be placed at the door of Congress. For this question has been before Congress during the past several years. And it could easily have been solved by the simplest and most straight-forward of amendments to the Wagner Act."

The Hauto Breaker



Coal for the new Hauto breaker comes from two refuse banks produced many years ago, but with sufficient coal in them to warrant reclaiming

The Hauto Coal Company, Since June 1944, Has Been Operating a New Breaker, Specializing in Preparation of Industrial Anthracite Fuel

By WILLIAM H. LESSER
Pierce Management
Scranton, Penna.

IN June of 1944, the Hauto Coal Company began to operate its new breaker at Hauto, just a few miles north of Lansford, Pa. This breaker specializes in cleaning industrial anthracite coal in accordance with current precise specifications concerning ash content and sizing. The location of the plant in the Eastern Middle Anthracite Coal Field, on the Lehigh and New England Railroad, 127 rail-miles from New York, makes it possible to ship to the great industrial area of the East at a favorable freight rate.

Source of Coal

Coal for the breaker comes from two refuse banks produced many years ago, but with sufficient coal in them to warrant reclaiming. . One of these banks, the Hauto, lies at an average distance of 1,000 ft. from the breaker. Shovels and dump trucks are used to load and transport run-of-bank to the dump-pit at bottom of intake conveyor. The other bank is located at Greenwood Colliery, 4 rail-miles from the breaker. Because this bank contains an appreciable amount of slate in the plus 5-in. sizes, they are removed from the run-of-bank by a precleaner. Under these conditions, material shipped from Greenwood, over the Lehigh and New England Railroad, contains only sizes that have passed through a five round mesh. No similar precleaner was necessary at the Hauto bank, because it does not contain the plus 5-in. sizes found in the Greenwood bank, where also, the loading and transportation facilities consist of shovels and dump trucks.

The Greenwood precleaner is built of steel, on the side of a bank at an elevation which makes it necessary to lower the material to railroad cars by means of a belt conveyor. It is equipped with the following machinery: a push feeder to regulate the flow of material from truck dump chute to the shaker; a shaker dressed with 5-in. round segments over which slate passes to a rock pocket, and through which coal drops to the coal pocket; and a second push feeder which regulates the flow of coal to the lowering 24-in. belt conveyor. Four 440 volt alternating current motors with interlocked magnetic controls supply power to operate the foregoing plant.

Breaker

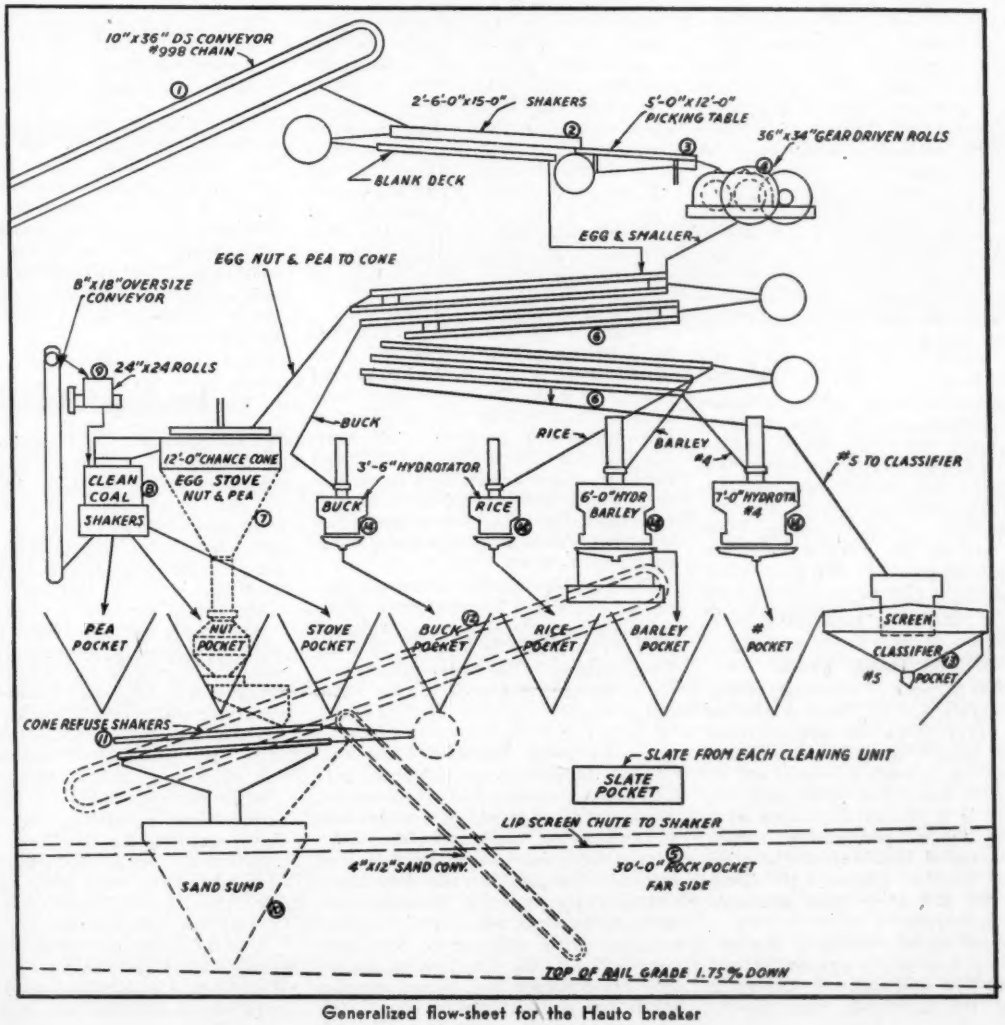
On account of a steel shortage, the breaker was built of wood and completed in June, 1944. It is designed to clean a run-of-bank feed of 4,000 tons in two 7-hour working periods a day. Eight sizes are shipped: stove, nut, pea, buckwheat, rice, barley, No. 4 buckwheat and No. 5 buckwheat. The coal cleaning equipment consists of a Chance cone, Wilmot hydrotators, and a Wilmot classifier.

A dump pit at the bottom of the main intake 36-in. flight conveyor (1) receives Hauto and Greenwood run-of-bank from dump trucks and railroad cars respectively. A push feeder in the pit, regulates the flow of material to the conveyor from which it is discharged onto a bull shaker (2) where it is split into two parts; plus and minus 4-in. round mesh. The plus 4-in. fraction passes over a picking table (3) where coal is hand-picked for crushing to sizes, egg and smaller in the No. 1 rolls (4). Slate is deflected from the picking table to slate pocket (5). The minus 4 in. fraction flows to a nest of shakers (6) where it is split into three sizes: mixed egg to pea inclusive; and the individual sizes buckwheat, rice, barley, No. 4 buckwheat, and No. 5 buckwheat.

Mixed sizes egg, stove, nut, and pea go to a 12-ft. Chance cone (7) in which coal is separated from slate. Cleaned coal from the cone is discharged on to the desanding and domestic shaker (8). Here the sand is removed and these sizes made: egg, stove, nut, pea, and the mixed sizes buckwheat and smaller produced in the No. 2 rolls (9). The sand goes to sand settling sump (10), the egg to the No. 2 rolls where it is broken to stove and smaller, cleaned sizes stove, nut, and pea flow to the pockets from which they are loaded into railroad cars, and the mixed buckwheat and smaller sizes go to a high speed shaker located at the intake conveyor dump pit where they are dewatered before dropping into the conveyor for repreparation. On this high speed shaker is also dewatered the pocket breakage made on pocket lip screens.

The individual sizes, buckwheat, rice, barley, and No. 4 buckwheat made on shakers (6) flow separately, each to a Wilmot hydrotator (14) where coal is separated from the slate. Hydrotator sizes are: buckwheat and rice, each 3'-6" diameter, barley 6'-0" diameter, and No. 4 buckwheat 7'-0" diameter.

High speed shakers are used only on the buckwheat and rice coal hydrotators for dewatering purposes. The barley and No. 4 buckwheat hydrotators are equipped with two-deck standard speed shakers for the purpose of dewatering the coal and removing undersize. These shakers make it possible to mix sized barley with No. 4 buckwheat, or sized No. 4 buckwheat with No. 5 buckwheat. Also, the undersize produced in the barley hydrotator may be dropped into the barley pocket or by-passed to



Generalized flow-sheet for the Hauto breaker

the No. 4 buckwheat pocket. Similarly undersize No. 4 buckwheat may be dropped into the No. 4 buckwheat pocket or by-passed to the No. 5 buckwheat pocket. The ability to blend sizes barley, No. 4, and No. 5 buckwheat appeals to consumers who specify such mixtures.

Buckwheat No. 5, together with much water and silt pass through 3/64-in. round mesh segments on the bottom shaker of shaker nest (6) to a 16-ft. Wilmot classifier (13). Here silt floats off through a launder to the silt settling tank, slate sinks and is removed by a conveyor, and the coal is discharged upon a high speed shaker which dewaters it and removes undersize.

Slate from the Chance cone is desanded on shaker (11), and then conveyed to slate pocket (5) by conveyor (12), while slate from the other cleaning units is chuted into the same pocket. A push feeder here moves it into dump trucks for disposal upon the area reserved for that purpose.

Water Supply

A 1,000-gal. pump in a creek supplies the breaker with make-up water through a pipeline 1,000 ft. long. This water is clean, does not contain silt in suspension; hence it is used on the domestic coal shakers, the hydrotator and classifier shakers, and on pocket lip screens.

Inasmuch as the make-up water is not sufficient to satisfy the demand of the breaker, water is recirculated by these two pumps: a 2,500-gal. pump taking water from the silt settling tank, figure 3, and discharging it upon the bull shaker and sizing shakers; and a vertical 900-gal. pump taking water from a steel tank, the top of which is on the same elevation as the loading track in the east side of the breaker. This tank receives water from the high speed shaker which dewaters pocket lip screenings, and fines from the domestic shakers. The pump discharges into the silt settling tank. A third pump, 2,000 g.p.m., pumps the overflow from the sand settling sump to the cone spray lines; also to the slate chamber refilling tank, and if necessary, to shakers.

Silt Settling Tank

For the purpose of providing water to recirculate, and to insure a silt-free waste water from the plant, a silt settling tank, figure 3, was constructed. It is built of wood 100 ft. long, 10 ft. wide, and 10 ft. deep. In the tank is a conveyor, moving at a speed of 20 ft. per minute, which conveys settled material to the slate pocket. Wooden flights 9 ft. long, 6 in. wide, and 4 in. thick, are used on the conveyor.

Clarified water overflows the settling tank around its perimeter, and then flows in a launder to the sump tank of the 2,500-gal. recirculating pump. Excess clarified water is wasted and flows to a creek.

Substation

Electric power is supplied by the Pennsylvania Power and Light Company through a 750 kva. substation protected by fused air-break switches on the high voltage side, and an air circuit breaker on low voltage side. The high and low voltage of the station is 11,000 and 440 volts respectively.

Power Equipment

There are 37 3-phase, 60-cycle, 440-volt motors in the breaker with a total rated capacity of 930 hp. Slip ring motors drive conveyors and rolls, while all the other machinery is driven by high torque squirrel cage motors. Speed reductions between motors and machinery are made by V-belt drives.

Line starters with push buttons located conveniently near the motors control squirrel cage motors. Drum controllers, hand operated, near motors, start the slip ring motors. Each starter and slip ring motor line switch are located in its own compartment in a cabinetrol which was wired completely at the factory, thus avoiding the usual buss construction required by a group of motors. The cabinetrol was shipped in one piece, and, without any alterations, was hoisted into the breaker and placed in its final position. The only work necessary on control and line circuits was that necessary to connect them to the cabinetrol.

Heating Plant

Heat for the breaker is furnished by unit heaters receiving steam at 15 psi. from a 200 hp. boiler located 200 ft. from it. The condensate from heaters is returned to the boiler in accordance with accepted plant heating practice. Both the blast fan and feed pump are driven by electric motors which are started and stopped automatically when the steam pressure and water level regulators function.

During cold weather an ample supply of hot water is required to thaw frozen coal in the Greenwood railroad cars. This water is supplied by a hot water heater in the boiler plant capable of heating 200 gal. of cold water per minute.

Testing Equipment

Since industrial anthracite is sold in accordance with rigid specifications, a completely equipped laboratory was a prerequisite. A Rotap sizer determines the sizes in each car of coal shipped. Samples for ash determination are prepared in a Braun pulverizer, and burned in an electric furnace supplied with oxygen to accelerate combustion. An electrically heated steel oven is used to dry coal samples taken for size determination.

Quality of Coal Shipped

For the purpose of showing the type of test made of shipped industrial fuel, this test of a typical car of No. 5 buckwheat is submitted:

	Percent
—3/16" + 3/32" round mesh..	0.12
—3/32" + 1/16" round mesh..	19.66
—1/16" + 3/64" round mesh..	7.18
—3/64" + 1/32" round mesh..	55.24
—1/32" + 80 mesh.....	16.52
— 80 + 100 mesh	0.42
—100 mesh.....	0.86
Ash	13.0

The breaker cleaning equipment has demonstrated its ability to produce anthracite coal in accordance with these specifications:

	Percent Slate	Percent Bone
Stove	0.75	3.50
Nut	1.50	4.00
Pea	2.50	5.00

	Percent Ash
Buckwheat	10.5
Rice	11.0
Barley	11.5
Buckwheat No. 4	12.0
Buckwheat No. 5.....	13.0

Pierce Management, Scranton, directs the operation of the plant for the Hauto Coal Company. The breaker was designed and constructed under a contract with the Wilmot Engineering Company, Hazleton, and the Central Pennsylvania Quarry, Stripping, and Construction Company, Hazleton, has contracted to do the loading and hauling of bank material and refuse.

Metallurgists Needed

THE Civil Service Commission has announced that metallurgists are needed at this time to fill positions in the Bureau of Mines, in Naval shore establishments and in War Department arsenals. The salaries, including overtime pay, range from $2,433 to $6,228 a year. Most of the positions are at the lower salary levels.

Applicants for the $2,433 positions must have had three years of technical experience in the field of metallurgy unless they can substitute appropriate education. The higher-grade positions require additional experience. No written test will be given and there are no age limits.

Interested persons may secure announcements containing full information regarding the positions, and application forms, at the nearest first- or second-class post office or direct from the United States Civil Service Commission, Washington 25, D. C.

Appointments to federal positions are made in accordance with War Manpower Commission policies and employment stabilization programs.

HIGH STACKS Overcome Concentrations Of Gases

Years of Study and Research Have Produced Gratifying Results in the Problem of Handling Objectionable Concentrations of Sulfur Dioxide Gas. The Tall Stack Method of Dispersion Has Revealed Some Very Interesting and Useful Phenomena

By

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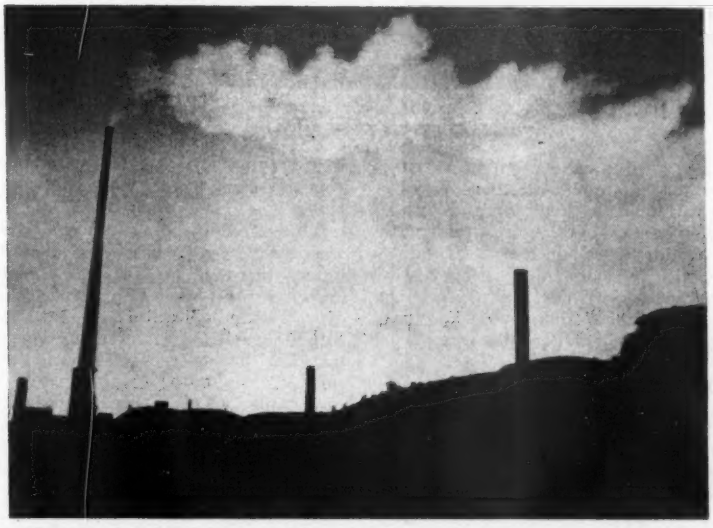


Smoke from the 605-ft. stack at Selby, Calif., blowing in a widely different direction to that of smoke from shorter stacks

THE use of high stacks emitting gases at high temperatures has done away with objectionable concentrations of sulfur dioxide at many smelters and has materially reduced them at others. This paper will concern itself with measurements of sulfur dioxide taken in the farming areas surrounding certain plants and with some other related data.

The baghouse for filtering non-acid smoke, and the Cottrell plant for electrical treatment of acid smoke streams have been improved until today the losses of solids from smelters are quite negligible. Neither the baghouse nor the Cottrell plant has any effect, however, on the gas, sulfur dioxide.

Years of Study Required

Thirty years ago the American Smelting and Refining Company set out to determine the conditions, and a program of operation by means of which their smelter at Murray, Utah, could operate without damage to crops. To accomplish this required years of study.

The pioneers in this study were the late Dr. P. J. O'Gara, and associated with him as chemist, Mr. Edward P. Fleming.* These men set out to determine under various wind and weather conditions, the concentrations of sulfur dioxide which occurred at varying distances from the stack. With their staff of chemists, they made tens of thousands of air determinations at different established locations. These showed that stack height does make a difference, and that temperature of the stack gases also makes a difference in the concentration of sulfur dioxide in the field.

Stacks Increased in Height

At first, Murray had a 200-ft. stack, then a 300-ft. one, and finally a stack 455 ft. high was built and air analyses were made, with three different types of operations.

Figure 1 gives the average concentrations of sulfur dioxide in the 5-mile zone. Curve A shows the average concentrations from the 200-ft. stack, measured to a distance of two miles, with a few determinations to three miles. Concentrations from the 300-ft. stack are shown as Curves B and C; curves D, E, F and G are similar studies with the 455-ft. stack. Each curve represents from 338 to 6,615 determinations. All show that the highest concentration of the gas occurs in zones from one-quarter to one and one-half miles from the stack, depending upon height, and that it gradually diminishes from that zone as distance from the stack increases.

Aids to Dispersion

An attempted reduction of ground concentrations of sulfur dioxide was made by the dilution of the gases from the 300- and 455-ft. stacks with about two volumes of air, by means of a large fan operated at the base of the stack. This also reduced the temperature difference between the stack gases and the outside air. Curves B and C reflect the effect of this dilution and cooling. From one-quarter to one-half miles away, the concentrations were much higher with the fan operating than when it was not. They declined rapidly, and about three-quarter miles away, they became less than when the fan was not in operation.

Curves D, E, and F represent the

* References at end of article.

High stacks have the ability to effect satisfactory dispersion in spite of occurrence of calms

average ground concentration from the 455-ft. stack with three types of operation—D without fan and without boiler gases, E with the fan but without boiler gases, and F without the fan but with hot boiler gases. They show that cooling by the fan reduced the effectiveness of dispersion and that heating by hot boiler gases increased it.

Later on a coal-burning stack heater was placed at the base of the stack to heat the gases going through. Curve G shows the corresponding average concentrations of sulfur dioxide with a temperature differential of 165° F.

Turbulence and Calm Weather Effects

It is not the average concentration, however, but the high peaks of occasional concentration which cause the difficulty. Normal air turbulence so diffuses the sulfur dioxide that it is unobjectionable most of the time. During certain periods of calm weather, however, peaks of concentration 10 or more times the average concentration occur. Table 1 gives the concentrations of sulfur dioxide from the 455-ft. stack, I, when the fan was not operating, II, when the fan was operating, III, when the fan was not operating but hot boiler gases were added to raise the temperature of these gases. These show, that whereas the average concentration over the four miles was 0.45, 0.41 and 0.24 p.p.m., the corresponding average maximum concentrations were 2.69, 2.22 and 1.83 p.p.m. At three-eighths of a mile from the stack, No. I and No. II show peak concentrations of 5.7 p.p.m. and No. III 2.5 p.p.m. The total frequencies above one p.p.m.—268, 177 and 95 respectively are shown for the same three types of operations.

This effect of calms was recognized very early, and a method of avoiding injury through what was locally known as the "Sea Captain" method of operation came into being as a result. It consisted of reducing concentrations during critical weather by closing down part of the roasters at such times. This increased cost of smelting operations tremendously because labor costs remained the same, though the volume of ore treated was much curtailed.

Theoretical Considerations

Air analyses after the installation of the stack heater, led Dr. O'Gara to conclude that a rise in temperature of 1 degree F. was the equivalent of 2.55 ft. of additional stack height.

At Tacoma, Wash., air determinations to a distance of 6 miles were made with the 300-ft. stack in 1917, and with the 573-ft. stack in 1918. Figure 2 shows the effectiveness of the tall stack in materially reducing the high peak of average concentration.

The literature is profuse with studies of stack height as affecting air pollution. The paper of Bosanquet and Pearson, summarized in the "Transactions of the Faraday Society,"[2] under the caption "The Spread of Smoke and Gases from Chimneys," succinctly states the law of gaseous dispersion from chimneys as follows: "A theory has been developed by dimensional analysis for calculating the spreading of a smoke cloud from a chimney, and the results have been shown to agree reasonably well with experiment. At points close to the chimney the concentration at ground level is small, since but little smoke has diffused down to the ground. At a distance of the order of 10 times the height of the chimney the smoke concentration at ground level reaches a maximum. The concentration at that maximum varies inversely as the square of the chimney height, and its actual value is almost independent of assumptions as to the variation of diffusion coefficient with height. At greater distances the concentration

TABLE I. MURRAY SMOKE STREAM—455-FOOT STACK

GROWING SEASON 1918

I Fan Not Operating—No Boiler Gases—2,668 Determinations.
II Fan Operating—No Boiler Gases—1,484 Determinations.
III Fan Not Operating—Boiler Gases—2,214 Determinations.

Miles From Stack	Parts Per Million of SO_2								
	Maximum			Average			Frequency Above 1 P.P.M		
	I	II	III	I	II	III	I	II	III
⅛	3.8	3.4	3.0	0.57	0.35	0.33	48	7	4
¼	4.5	3.8	1.1	0.49	0.45	0.21	14	9	1
⅜	5.7	5.7	2.5	0.57	0.47	0.27	31	15	11
½	3.3	2.4	2.4	0.61	0.59	0.29	15	20	5
⅝	3.8	2.4	3.3	0.48	0.75	0.43	22	21	17
¾	2.5	2.2	3.0	0.36	0.65	0.31	16	27	7
1	3.8	2.8	2.7	0.38	0.49	0.33	20	11	12
1¼	1.8	3.6	2.8	0.39	0.74	0.35	22	28	12
1½	2.6	0.7	2.4	0.34	0.15	0.23	10	0	6
1¾	1.2	2.2	1.7	0.43	0.44	0.28	15	6	7
2	2.1	1.6	1.6	0.40	0.31	0.20	15	6	2
2¼	2.2	2.3	1.5	0.42	0.48	0.27	12	10	6
2½	1.3	1.2	1.1	0.40	0.24	0.12	2	2	1
2¾	1.2	1.4	0.4	0.46	0.35	0.12	10	7	0
3	2.4	1.3	1.2	0.57	0.27	0.17	16	5	1
3¼	0.9	1.6	1.2	0.27	0.35	0.16	0	3	2
3½		0.8	1.6		0.16	0.21		0	1
3¾		0.5	0.3		0.09	0.06		0	0
4			0.9			0.16			0
Total							268	177	95
Average	2.69	2.22	1.83	0.45	0.41	0.24			

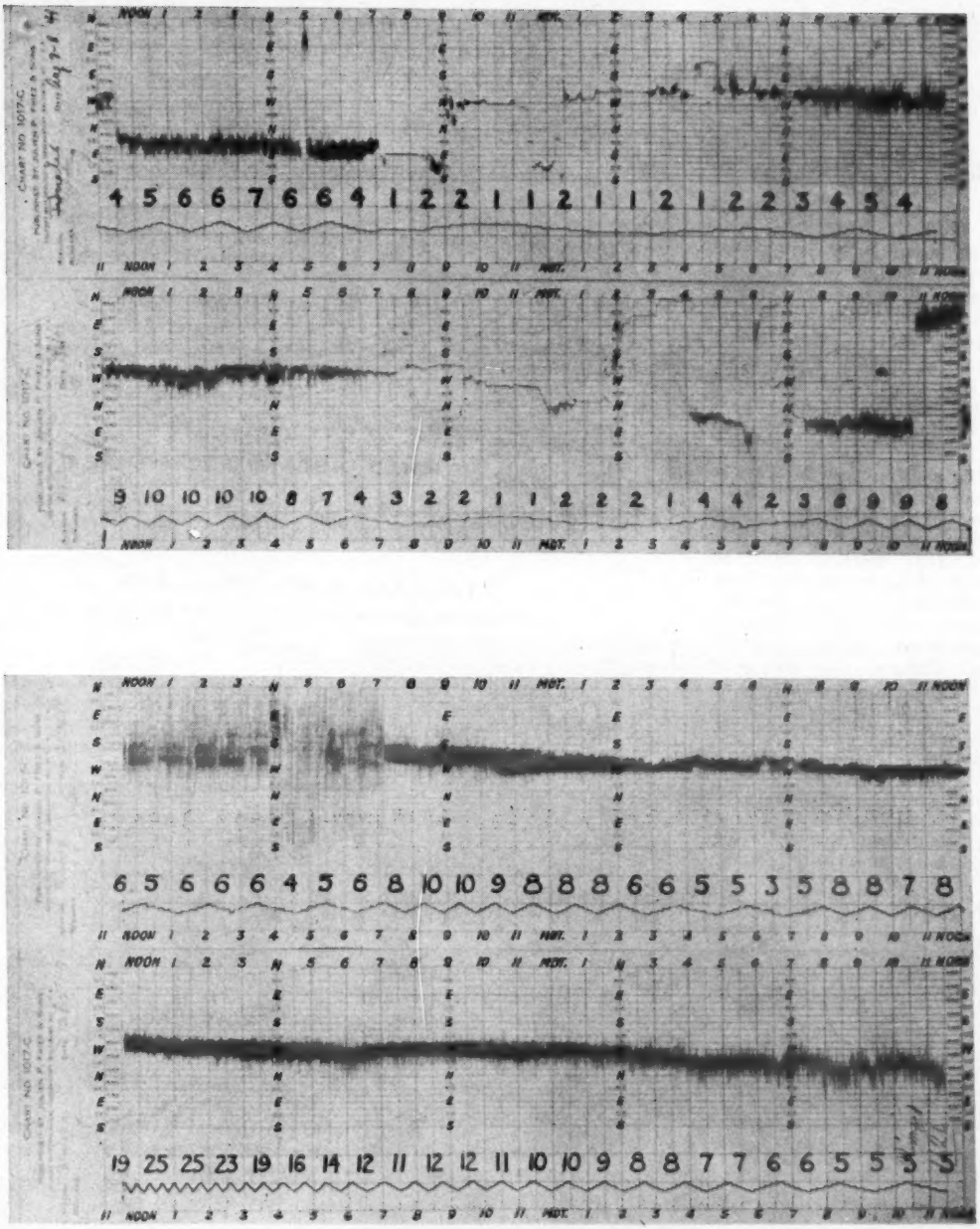


Fig. 3. Wind direction and velocity on four selected days showed wide variations

at ground level falls off again until after about 50 chimney heights the concentration varies as the inverse square of the distance and is independent of chimney height." The illustrations already shown and those to follow tend to corroborate this statement.

The Problem at Selby

In 1928, Dr. M. D. Thomas perfected his sulfur dioxide autometer[3] by means of which sulfur dioxide is determined and recorded continuously and automatically. In April, 1934, one of these highly sensitive robots was installed at Dillon Point, which station, elevation 100 ft., is located 2.6 miles easterly from Selby, Calif., on the opposite side of Carquinez Straits, where the Selby Smelter Commission[4] had made similar studies. At this time Selby was eliminating its sulfur from a stack 146 ft. high. The American Smelting and Refining Company was hesitant to build a higher stack for fear that the peculiar topography surrounding Carquinez Straits on which Selby was located, amounting to almost a gorge with hills on either side several hundred feet high, might increase rather than reduce the concentrations of sulfur dioxide in parts of the surrounding country.

In addition to a stack heater at Selby, it was necessary to curtail operations a great deal of the time when unfavorable wind conditions prevailed. High concentrations could not always be eliminated even by these means, because wind conditions producing them could not be anticipated. Reme-

dial measures at any plant might accomplish the desired results 99 percent of the time. The concentrations during the remaining 1 percent is what matters. What characterizes air movements during such times?

The Behavior of "Calms"

A study of the occurrence of calms developed the fact that these occur at irregular intervals, even in places of high average wind velocity, such as New York, where protracted calms are found to occur several times during a growing season. Such calms frequently occur simultaneously at almost the exact hour and degree of calmness at New York, Sandy Hook and Trenton, roughly 20 and 50 miles away.

To get the picture of such calms, a special drum was built on which wind direction was recorded directly. Figure 3 shows the wind direction and velocity on four selected days at Whiting, Ind. Most of the time there is an oscillation in wind direction ranging from about 22½ degrees—the space between adjacent parallel lines—to 90 degrees, and even 180 degrees. During periods of calm, the width of this oscillation narrows down often to the width of a line. The number of these major oscillations ranges from approximately 50 to 150 per hour. Smoke, entering a highly oscillating field, would be fanned out to the extent of such oscillations. Without this turbulence it tends to pile up, cloud-like. Corresponding vertical oscillations also occur.

On the upper two charts, several hours of calm occur. The third chart pictures several hours of moderately low wind velocity with extremely wide

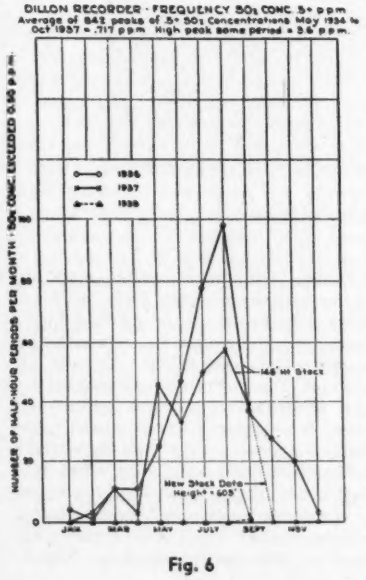


Fig. 6

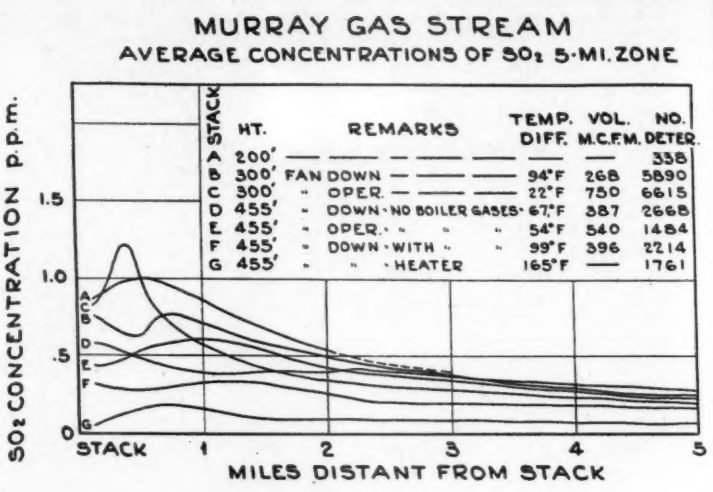


Fig. 1

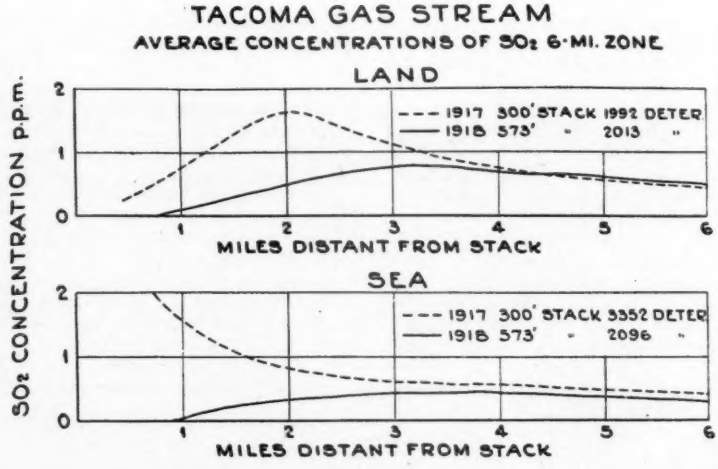


Fig. 2

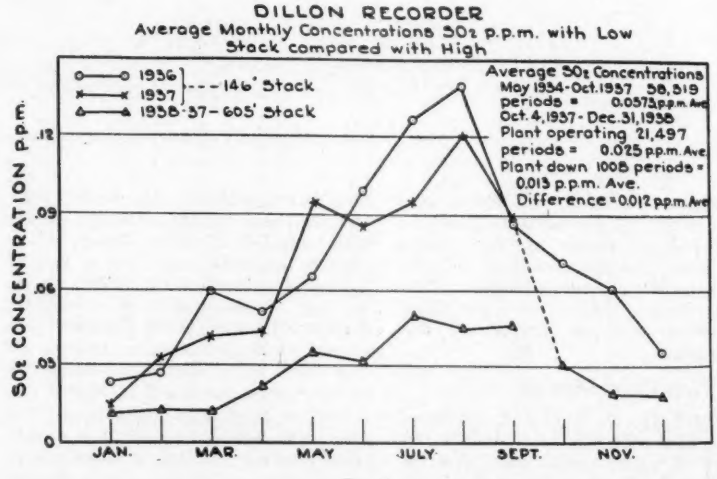


Fig. 5

oscillations. In it, the wind vane pointed to all points on the compass every few minutes. Unless some of the intermittent swings are less than 180 degrees, giving a definite directional drift, the effect is that of a dead calm. The lowest chart shows the oscillations during the highest velocity—that of 25 miles an hour—recorded that year. Smoke entering such an air stream would be spread out from 90 degrees to 135 degrees.

Effects of Wind Divergence

A condition favorable to smoke dispersion from a tall stack at times of low wind velocity has been found. Table 2 shows the percentage of hours the Selby Hill weather station, elevation 387 ft., recorded a divergence greater than 45 degrees for more than 3 minutes per hour, from that of the Tunnel weather station, located only a quarter of a mile away but 200 ft. lower in elevation. Standard wind-direction charts show wind direction to 45 degrees only. In these, an aver-

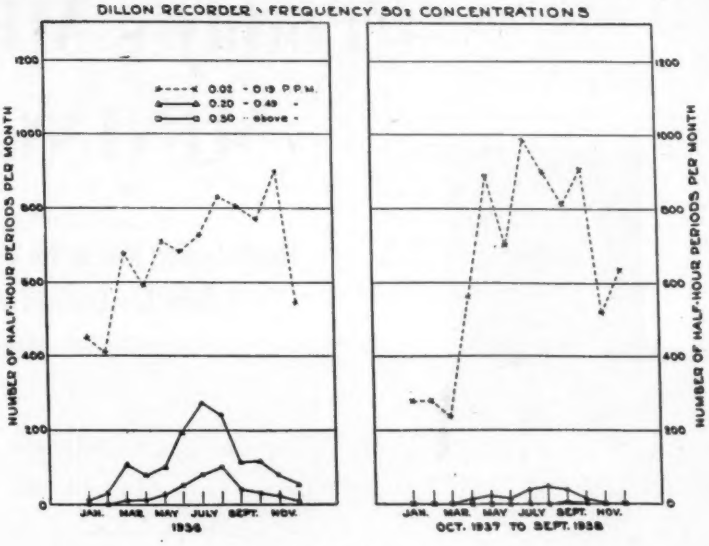


Fig. 7

TABLE II

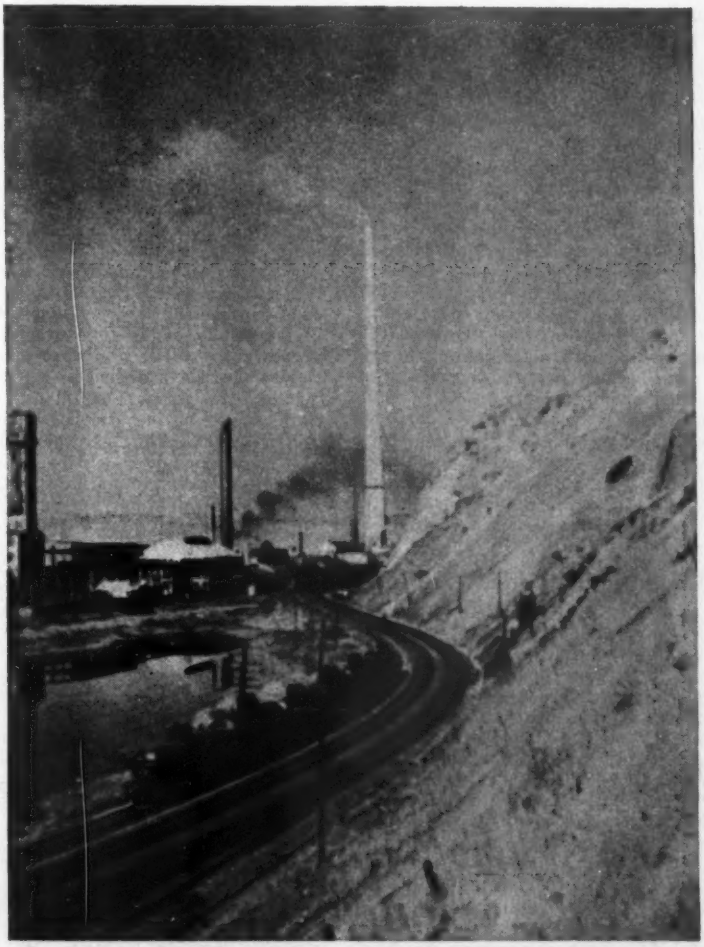
PERCENTAGE OF HOURS THAT THE TUNNEL WEATHER VANE SHOWED A DIVERGENCE GREATER THAN 45 DEGREES FOR MORE THAN THREE MINUTES PER HOUR FROM THAT SHOWN BY THE SELBY HILL STATION.

Month	1936	1937
January	...	71.7
February	...	75.8
March	78.0	75.7
April	77.6	83.2
May	73.6	82.2
June	64.5	85.5
July	59.2	76.0
August	56.3	83.6
September	77.5	...
October	77.6	...
November	69.6	...
December	65.5	59.5

age divergence of greater than 45 degrees occurred for more than 3 minutes per hour more than 50 percent of the time in each month from March, 1936, to August, 1937. At Selby, Dr. Abersold found, with toy balloons—one inflated with hydrogen, the other with hydrogen and air to air buoyancy—that there was an average divergence of direction of 15 degrees between ground currents and those approximately 600 ft. above the ground. At Tacoma, it has been regularly noted that smoke from the 573-ft. stack varies greatly from the direction of ground smoke, and not infrequently these smoke streams go in opposite directions.

The accompanying pictures show smoke from the 605-ft. Selby stack and smoke emitted lower down, going in different directions. Such differ-

(*Continued on page* 34)



At times of low wind velocity there is tendency for smoke at the ground to drift in a direction different than that higher up

Today's MECHANICAL MINING Systems

Mobile Loaders Now in Use and the Transportation Systems Used With Them Are Analyzed With Respect to General Overall Loader Efficiency

By P. R. PAULICK
Consulting Mechanization Engineer
Library, Pennsylvania

IT IS advisable from time to time to assemble data on the various phases of the comparatively youthful art of mechanical loading as now practiced in American coal mines, and to offer some discussion on the theory and practice of the various modes of mechanized mining. In this presentation our efforts are concerned primarily with the status of mobile loaders.

There is an erroneous impression in the minds of some people that mechanized mining is now of age, and that it has reached its ultimate development seemingly because we have, for example, provided machines capable of loading 8 to 10 tons per minute. It should be pointed out, however, that as an art mechanized mining is still young because first, of the many outmoded and inefficient practices found in numerous coal mines; second, we have not yet developed adequate transportation services to handle the capacity of our large loaders; and, only a little over 40 percent of the coal mined is now being produced mechanically.

What is Mechanical Mining?

For purposes of discussion, mechanical mining means the actual handling of coal by any mechanical contrivance other than the miner's hands, and ultimately putting it into mine cars or conveyors for transportation to the outside. While cutting, drilling, haulage, et cetera, when done by machinery, can also be placed in the category of mechanical mining, we shall confine the term here to actual loading.

The ultimate goal of mechanized mining will be attained of course when a machine is developed that will mine the coal "off the solid" thereby eliminating the supporting services of cutting, drilling, bugdusting and shooting. Only the loading and conveying operations will be needed and the necessary timbering for safety. Coal will be handled by flexible and extensible conveyors delivering into large capacity mine cars, say 12 to 15 tons capacity, or onto belt conveyors for delivery to the outside. Mechanized mining has now reached a point where we can classify the basic principles of application of the loading and transportation systems prevailing at recognized efficient operations.

The Purposes of Mechanizing

From a coal company standpoint, the primary purpose of mechanizing lies in the hope of attaining a lower production cost to maintain its competitive position in the industry. However, when contemplating mechanized mining it is absolutely necessary that equipment selected be found compatible with the existing conditions; that good engineering layout and planning is made use of; that equipment is properly installed; and that efficient supervision is furnished at all times.

From the miner's standpoint mechanical mining is highly desirable in that his work becomes easier. In the post-war period it should be possible, through advances in mechanization, to reduce to a minimum the number of working hours necessary for him to earn his living.

While true that mechanizing the cutting, drilling and transportation of coal has greatly simplified mining, the greatest saving to both operator and miner is found in mechanizing the loading phase of the operation. The act of lifting the coal from the mine floor and depositing it into mine cars or conveyors mechanically, removes the greatest physical burden from the worker and also offers the best possible means of cost reduction.

Planned Objectives

A successful mechanical loading program is not merely "dreamed up" or invented, but is the result of much hard work and thought given to preliminary engineering study. Besides this, face preparation must be thoroughly and carefully planned so as to properly correlate the different elements of the operation. The whole must be made to function as a unit. Development of entries, and extraction of room and pillar coal must be thoroughly worked out and scheduled. The question of track versus trackless mining for the existing natural conditions must be thoroughly covered.

Main line haulage must be planned and laid out to give adequate service to the loaders. Type and source of power must be determined. Whether AC or DC power is best for the equipment selected must be known, as well as how far from the working face the sub-station should be located. A feasible system of maintenance and repair must be worked out, especially including good lubrication facilities. Type and size of preparation plant enter sharply into the picture. All of these details must be thoroughly worked out and planned before any mechanical loading system is installed in a coal mine.

With preliminary decisions made, it becomes necessary to agree on the type of loading and transportation system, utilizing the best available thought on the subject in order to select best available equipment. During this selection period such supporting equipment as cutters, drills, etc., must be determined upon in order to arrive at a well-rounded and coordinated set-up. Low unit production costs are not obtained simply by buying a certain type of unit that is doing such a swell job at "X" operation. Good results are obtained only by selecting proper equipment and coordinating the different working elements of a loading unit with intelligent planning and supervision.

"Available Time" Analysis

The total available time of any mechanical loading unit (exclusive of portal travel time in and out) be it track mounted, caterpillar mounted, or rubber tire mounted, may be divided somewhat as follows: Tram with loader place to place, 10 percent; Load

coal, 37 percent; Change mine cars, shuttle cars or transfer cars, 35 percent; All delays, 18 percent. With the conventional room and pillar mining, block mining system or in fact any type of mining except longwall, a certain percentage of the day will be spent "tramming with the loader." If the mine is properly planned and rooms are cut as wide and deep as possible, it is possible to maintain this time at a minimum of say, 5 or 6 percent. Coal height, of course, enters in also. At mines where mine layout is hit or miss and no thought is given to planning, "tramming with loader" time amounts to around 15 to 18 percent. "Load coal," the most important and the only directly productive one of the four divisions of loader time consumes anywhere from 20 to 30 percent at low efficiency operations to as high as 60 to 65 percent at especially well planned and highly efficient operations under good supervision. With facilities available today, loading time should stand at not less than 55 or possibly even 60 percent. The third division, "change cars," buggies, or transfer cars amounts to anywhere from 25 to 45 percent. This item can be reduced by decreasing the "change" distance and/or installing a large type mine car. It can be eliminated entirely by substituting conveyors for mine cars as the medium of transportation behind the loader. The last item, "total delays," varies anywhere from 10 percent at efficient operations to as high as 50 percent at the other extreme.

Chart of Loading Systems

In addition to the type of preliminary investigations outlined in the foregoing discussion, the accompanying chart will be found useful in checking an existing operation or in making preparations for new installations. For instance, let us suppose that an operator has caterpillar mounted loaders with shuttle car transportation, but is not getting the desired results. The management, in all probability, feels that it has put in the latest and best available loading and hauling equipment. However, an engineering survey and analysis of all the factors of the operation disclose some incompatibilities. Two-ton old style mine cars are being used and the track is built with 20- and 25-lb. rail on wood ties, necessitating much track work. The small rail provides very poor track and there are many delays from derailments and slow haulage.

Again, 5-ton shuttle cars are used for face transportation. These transfer the coal into regular mine cars via an elevator set-up in a breakthrough. Thus a production bottleneck has been placed at a point where coal is transferred from shuttle cars to the regular mine cars. The answer to this problem is the installation of a suitable belt conveyor in the production entry so as to receive coal from shuttle cars. A whole trip of regular mine cars is then loaded on the main entry. Such a belt can eliminate the bottleneck as well as all track work in production entries, with savings of perhaps 6 to 14 cents per ton in tracklaying cost.

Since it is impractical to refer to specific examples of mechanical mining operations in this paper, the accompanying chart can serve as a means of discussing the general principles of various mechanical mining systems.

Use of the Chart

Mobile loaders may be grouped into three distinct general types. The distinguishing features of these are the *mounting*, the *motive power* and design of the *loading head*. The three types are: Track mounted (1); Caterpillar mounted (2), and rubber-tire mounted (3). Analysis must be con-

(Note: Numbers in parenthesis refer to chart.)

From the miner's standpoint mechanical mining is highly desirable in that his work becomes easier

With preliminary decisions made, it becomes necessary to determine type of loading and transportation system best suited to a well coordinated set-up

fined to the first two of these as the tire-mounted unit has not yet been developed commercially ,although just prior to the war several companies were carrying on extensive experiments with it. The classification of loaders is further qualified by the type of transportation service supplied.

The track type loader is generally the simplest and possibly the oldest type of loader made, and is the forerunner of all similar present-day equipment. While it is a popular model—it does not lend itself to so many different types of transportation and mining systems as does the caterpillar. Until about 1936, the track type was served exclusively by regular mine cars (4). The trend toward larger tonnage outputs has brought about a gradual increase in mine car size so that we now have 10-ton mine cars serving such loaders in room and pillar system with excellent results.

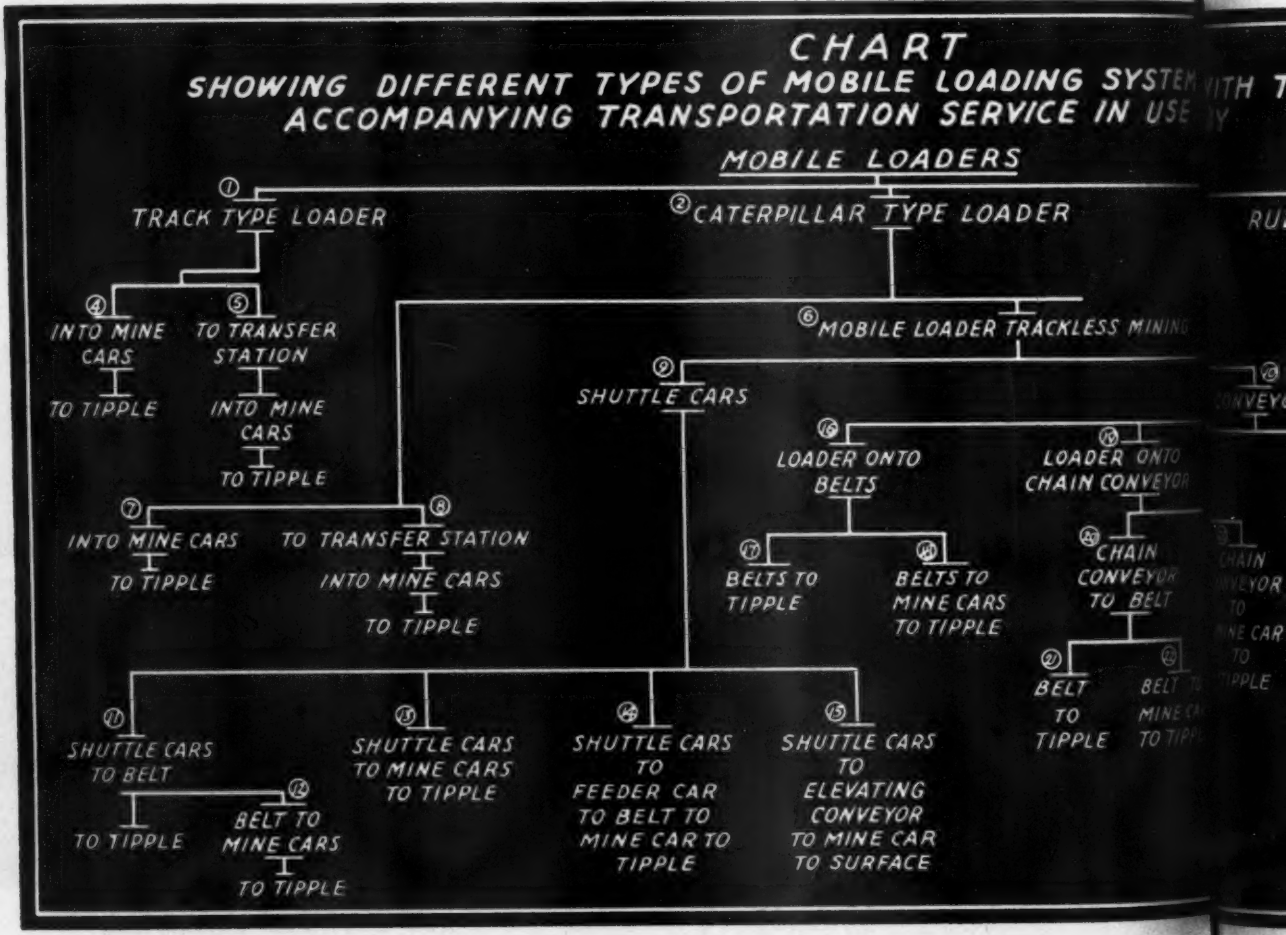
In 1936 experiments were conducted and plans made to install large type transfer cars (5) to be used at the working face only. The transfer car and transfer station idea was devised simply to overcome the inefficiency of using small mine cars behind the loader in mines where it was impractical to install large type cars throughout. The main reasons for this were long haulage and narrow entries, deep small area shafts, narrow gage track, etc. Hence by simply providing 4 to 6 large type mine cars per loader and transfer points at which to dump the coal from the large cars into regular cars, it is possible to increase the loading efficiency of the mechanical loaders by from 70 to more than 100 percent. This also decreases the percentage of "car change" time to a more desirable figure with a corresponding increase in the "loading" time percentage. Large type transfer cars in use with appropriate transfer stations, have been installed to handle up to 600,000 tons of coal before the transfer station is moved.

The following condensed time studies were made on mobile loaders before and after installation of a large mine car. The mine cars involved are of approximately 3 tons capacity in the first case and approximately 9 tons in the improved installation. The mobile loader was track mounted. This illustration properly represents item (1) in the chart:

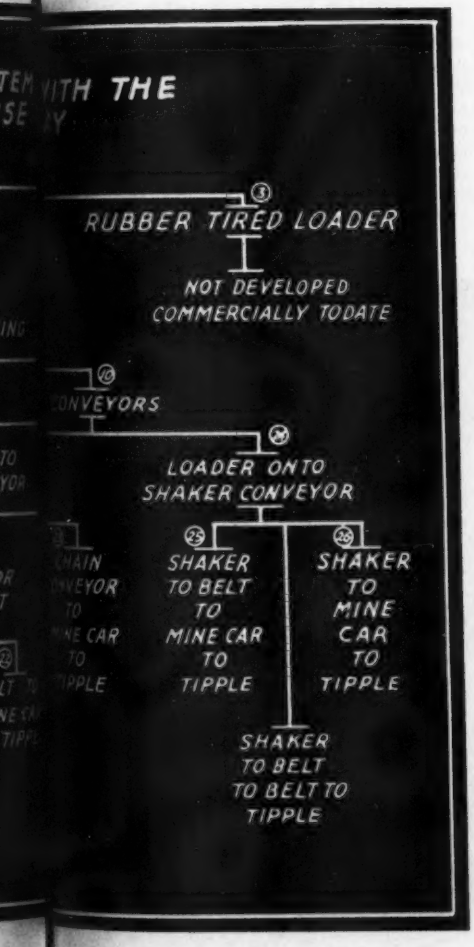
Element	*Percent Before*	*Percent After*
Tram with loader...	10	15
Load coal	37	60
Change cars	35	16
All delays	18	9
Total	100	100
Tons loaded	354	573

Caterpillar Type Loaders

The caterpillar type loader was first put on the market about 1916. It is very flexible and easily lends itself to many different mining systems possessing as many car service or coal "takeaway" schemes. For instance, the caterpillar type loader can be used with ordinary mine cars (7) just as the track loader. Or it can be used with large transfer cars and transfer station (8) similar to track loaders. But, while the caterpillar loader does a good job of loading coal directly into regular mine cars, or large transfer cars on track, there is nevertheless an extra amount of track work involved with this type of loader over



The caterpillar mounted loader is very flexible and lends itself easily to many different mining systems



the regular track mounted loader. For example, in loading out a room with caterpillar loader with car service on track, after the place has been cut and before being shot, short pieces of rail-jumpers must be taken up to permit lowering the loader head on the mine floor. Again, after several cars have been loaded, these same jumpers must be relaid to permit placing the mine car under the loading boom of the loader. A variation of this practice is to use "rerailers" on the end of the track. During the loading operation the mine car is simply run off the end of the track onto the mine floor, loaded, and pulled back on the track by means of these rerailers. In any case some productive time is lost by a caterpillar loader when being serviced with mine cars on track.

Mobile Loaders—Trackless Mining

Because of previously mentioned disadvantages and conflicts, and to save the 4 to 16 cents per ton track cost usually associated with track mining (the actual cost depending upon the size of rail used, kind of ties—wood or steel—recovery system, etc.) present-day trackless mining systems have been developed. Incidentally, when the rubber-tired loader is fully developed and placed on the market it will lend itself to all the set-ups outlined below and possibly several not now in use. Suffice it to say that this type of loader definitely has great possibilities.

"Trackless" mining systems can be divided into two general groups: loading into shuttle cars (9) wherein the direct service medium to the loader is a car mounted on rubber tires—although it might be mounted on rubber caterpillars if and when these are available; second, loading into either chain or shaker type conveyors.

Shuttle Cars

Shuttle car service operation is further subdivided into five types: *One*—Caterpillar mounted loader (11) loading coal into the shuttle cars from which it is unloaded onto a belt conveyor usually located in an entry at right angles to the production rooms. This belt takes the coal directly to the outside and the system is applicable to small mines wherein the total length of the property does not exceed 3,500 ft.

Two—Coal is loaded into shuttle cars with "cat" mounted loader, the shuttle cars load onto a belt (12) laid in a production entry. From this belt the coal is loaded into mine cars and hauled to the outside. This system readily lends itself to large operations since any number of such units can be installed in any one mine. Of the many types of trackless loading systems in use today this one is probably the best and most prevalent.

Three—The shuttle car (13) empties directly into a string of mine cars. This can be done in two ways: either a ramp is built to elevate the shuttle car over the edge of the mine cars, or the mine track is depressed so that the shuttle car can unload directly into the cars. Sometimes a combination of both is used. While this is a very simple set-up it would appear that the additional expense of buying and installing a rubber belt conveyor would

pay for itself over a very short period of time.

Four—A small feeder conveyor with hopper (14) is set up ahead of the belt which takes the load from the shuttle cars. This feeder is timed to properly load the belt and empty its load while the shuttle car is back getting more coal. This system works nicely where two or more loading units are served by one belt. The speed of the feeder is so regulated in this case that while coal from the other loader empties on the same belt, the additional coal from the second loader does not overload the belt to the point where spillage becomes a problem. In fact, to date this is about the only solution to the problem of coordinating the output of two or more loaders loading onto one belt.

Five—The shuttle car empties its load into an elevator (15) located in a breakthrough, and this elevator loads a trip of mine cars in a parallel entry. While this system has many good points, it also has several disadvantages. For example, in a production entry of 2,500 ft. wherein one continuous belt could serve throughout the whole length, the elevator would have to be moved at least 8 times. Each move costs anywhere from $200 to $500 depending upon the mining system developed and the efficiency of the workmen. Furthermore, with elevator service, a secondary track must be laid throughout the length of the production entry which, of course, adds to production costs.

Trackless Mining—Conveyors

Trackless mining systems using conveyors as the primary transportation medium can be subdivided into: caterpillar mounted loader loading directly onto belts (16); loading onto chain conveyors (19); and loading onto shaking conveyors (24).

In very small coal mines it is possible to have a caterpillar mounted loader load coal directly onto a properly designed belt conveyor (17). This belt then conveys the coal directly to the outside preparation plant, or to a large hopper or bin from which the coal is taken away in large trucks. While this is a very good mining system it can be used only within the limits of a belt conveyor extension—usually a maximum of 3,500 ft. A slight variation of this system would be to have the first belt dump onto another belt, thence to the outside.

It is possible to have a loader load coal directly onto a belt, the belt unloading its load into regular mine cars (18) and so on to the outside. Like the above set-up this means that a specially constructed belt conveyor must be built so as to withstand the shock of direct loading of coal by a mechanical loader. This has been done and several units are available for this type of work. Incidentally, this is the fastest transportation system yet developed for direct mechanical loading. While these belt conveyors are not yet perfect they do a very good job of taking coal away from a loader of any size.

Mobile Loading Onto Chain Conveyors

The first combination mobile loader and conveyor as primary transportation installation was made with chain conveyors. The use of chain conveyors as primary transportation service media for mechanical loaders was brought about in the search for ways and means of reducing or entirely eliminating the 35 percent spent on car change time. While it is true that substituting conveyors for mine cars and using shuttle cars in primary transportation have practically eliminated the time spent on car change, there is one disadvantage to using conveyors for this work. This is, that up to date no chain conveyor has been built large enough to handle the output from any but the smallest mobile mechanical loaders. One set-up with chain conveyors consists of driving twin rooms abreast connected with suitable breakthroughs through which the mobile loader and cutters pass back and forth. Only enough men (usually 5) are put on a crew to permit loading in one room, while preparation takes place in the other. To date very good results have been attained with this system.

One such system uses chain conveyors to serve directly behind the mobile loader (20) the chain unloading directly onto a belt conveyor. This belt conveyor (21) takes the coal directly to the outside preparation plant. As mentioned before, this system is limited by the maximum extension of the belt.

In larger mines this system can be expanded to the point where the chain conveyors (22) unload into a belt conveyor installed in production entries, with coal moving thence into a trip of mine cars located on the main entry. As many such units can be set up as are needed to obtain the projected mine tonnage. Another variation that is sometimes used is to have the chain conveyors unload directly into a trip of mine cars (23) which are then hauled to the outside. In any of these

(*Continued on page* 72)

The ever popular track type loader is the forerunner of all similar present day equipment

A mica-mine dump is "prospected" with profit by the gem cutter of Hawk, N. C.

A zircon being faceted in the old mill shop of Roby Buchanan. He now possesses much modern equipment

GEMS From Mine Dumps

By BILL SHARPE

North Carolina State News Bureau

ROBY BUCHANAN didn't build a mousetrap, but he did teach himself to cut native gems, and as a consequence a good-sized chunk of the world has worn new ruts into the country road which leads to his humble shop back in the mountains of Mitchell County, N. C. This has changed Roby from a farmer-miller who liked to pick up "pretty" stones at the mica mines, into a gem-cutter who farms on the side.

His mill, with its picturesque waterwheel, had been ingeniously geared so that by pulling a lever the water power could leap from the homely grindstones over to a contraption which turned a diamond saw for the day's hobby hour. Now the waterwheel is gone, and Roby has "fotched-on" power—an electric line running to his shop. "Couldn't keep up with the orders with that thing," he says ruefully.

Roby cut, faced and polished his pretties for ten years before anybody paid much attention to his hobby. Workers in the mica and feldspar and other mines sometimes would come by and show Roby a piece of quartz or something and ask him to cut it for a ring "for the old lady." Tourister folks from Linville and Burnsville heard about Roby and began bumping their cars over the wash-board road, usually to leave an order for a native emerald, a ruby, a zircon, or aquamarine.

When they got home their friends began to send in mail orders. Gem collectors sent in rough stones for cutting. Then, one day, an important looking car drove up the road to Hawk and disgorged an individual who turned out to be a jeweler from a far-away city. He gave an initial order that made Roby's eyes pop, and which quickly deprived the Hawk community of its only gristmill.

Buchanan's place is in the heart of the Carolina mining country, where a good share of the country's domestic mica is produced. Occurring with mica and various ceramics of the section (over 300 minerals have been identified) are many semi-precious stones. The finest quartz in America is produced here (it was used in making the Mt. Wilson observatory lens), and from quartz come many semi-precious stones. The gems ordinarily occur in too small a quantity to be of commercial value, and they actually constitute a nuisance in some instances. An otherwise perfect sheet of mica, for instance, might be splotched with brilliant, but small, garnets.

Miners chancing upon such stones peddle them to Roby, who makes occasional trips throughout the state to pick up material saved for him. He also prospects the mine dumps, where he makes many a haul.

The rough stones are first cut into blocks on a diamond saw. The perfect blocks are ground into rough shapes on a carborundum wheel. Then the gem is placed in a holder, which applies the stone to the grinder for the facets. The more facets, the more brilliance, and Roby has put as many as 800 facets on one stone, though the average stone is given only 100 or 200.

Formerly, the stones were sold unset, but now Roby's daughter-in-law, a skilled goldsmith, sets many of them.

Seven years ago this reporter bought a beautiful zircon from Roby for $20. Last month, a piece of jewelry produced by Roby and his daughter-in-law sold in a city jewelry store for $2,000. It seems that in the interim, Roby Buchanan, farmer-miller, had become a lapidarist.

ALUMINA-FROM-CLAY Plant At Salem, Oregon

Demonstration Plant Now Under Construction Will Employ the Ammonium Bisulphate Process for the First Time on a Commercial Scale. This is One of the Important Steps Being Taken in the Development of the Aluminum Industry in the Northwest

By C. K. WHITE
Mining Engineer
Columbia Metals Corporation

THE idea of an alumina-from-clay plant was first definitely conceived in 1941, as a result of the submarine sinkings of bauxite ships in the Caribbean Sea. Aluminum was definitely necessary to the War effort. Bauxite from South America was the chief source of the raw material necessary for our required aluminum production. Government officials in Washington, realizing that domestic reserves of bauxite were extremely limited, became greatly concerned lest our supply of bauxite might be impaired. Clay, which was said to occur abundantly in various parts of the United States, particularly the Northwest, was suggested as a possible source for alumina. Columbia Metals Corporation, with head office in Seattle, became interested. The U. S. Bureau of Mines and the U. S. Geological Survey immediately began a program of investigation of possible clay deposits. Early in 1943, Columbia Metals Corporation offered to sponsor an alumina-from-clay plant, to be built in the Northwest.

Clay—As a Source of Aluminum Compounds

Chemical Construction Corporation, a subsidiary of the American Cyanamid Company, was already interested in the possibility of clay as a source for aluminum compounds, as for many years it had been engaged in the manufacture of alum. An alumina-from-clay pilot plant was set up at the Company's laboratories at Stamford, Conn., and the process, now known as the Chemico or ammonium bisulphate process, was developed to completion.

When Columbia Metals Corporation proposed to sponsor an alumina-from-clay plant in the Northwest, an agreement had been entered into with Chemical Construction Corporation whereby the Chemico process was to be used at the plant. Approval of the process by the National Academy of Sciences, as the most likely of many processes submitted, led to a tentative approval of Columbia Metals' proposal by the War Production Board, subject to approval of the plant location by the War Manpower Commission. All proposed locations for the plant were rejected by the War Manpower Commission and this rejection was followed very shortly afterward by a cancellation of the whole alumina-from-clay program. Three other demonstration plants had been approved by the War Production Board and were either in the process of design or under construction. These plants were, 1, the Kalunite Company's plant in Utah, to produce alumina and potash from alunite; 2, the Ancor Corporation's plant in South Carolina, using the lime-sinter process to treat limestone and clay, and to manufacture cement and an aluminate of sodium, which would be suitable for processing in a Bayer plant; and 3, the Monolith Portland Midwest Company's plant in Wyoming, likewise using the lime-sinter process, to treat lime and feldspar as the raw materials.

Alumina Program Reinstated

Largely through the effort of Mr. J. O. Gallagher, president of Columbia Metals Corporation, the War Production Board reversed its decision and reinstated the entire alumina program. Soon afterward, Salem, Oreg., being centrally located to the clay deposits of the Northwest, and having received the approval of the War Manpower Commission, was chosen as a site for the Columbia Metals plant. Contracts were entered into by Defense Plant Corporation whereby a plant was to be built at Salem to use the Chemico process, which would produce 50 tons of alumina per day, from clay containing 25 percent available alumina and 4 percent available iron, with the Chemical Construction Corporation as designers and builders and the Columbia Metals Corporation as operators. The plant is now under construction and is expected to be ready for operation early in the summer of 1945.

To Demonstrate Applicability of Chemico Process

The plant is primarily a demonstration plant and will be operated to demonstrate the applicability of the Chemico process to such clays as may be determined to be desirable by Defense Plant Corporation. Through the courtesy of Pope & Talbot, owners of the ground on which the Cowlitz clay deposit near Castle Rock, Wash., is located, approximately 14,000 tons of clay is being furnished by them, without charge, for the initial test at the plant. This tonnage is being mined and delivered by contractor, to Salem. Upon Defense Plant Corporation approval, other clays will subsequently be tested at the plant.

It should be clearly understood that the purpose of this plant is to demonstrate on a commercial scale a process that has been proven only in a laboratory plant. For this reason actual costs obtained in this operation will have an economic value only as they are projected to the operation of a plant designed in the light of the experience obtained at this plant, of a size and at a location which may be determined as economical. A report, setting forth such projections, both as to mining and processing, will be one of the direct objectives of this operation. The outline which I am about to present is a verbatim description of the process as it will be initially used at the Salem plant; it was written by Mr. W. B. Lambe, chemist for the Chemical Construction Corporation.

Presented to the 18th Annual Mining Institute, College of Mines, University of Washington, January 24, 1945.

Before I do this may I explain the plan of the plant.

Preliminary Processing

The raw clay enters the plant by rail at its eastern end. It is dumped into a track hopper and conveyed by a belt system to a hammermill which crushes the material to ¼ in. size or smaller. A conveyor belt then takes the clay to a rotary kiln where it is heated to approximately 1,500° F., which drives off the free and combined water. This treatment makes the clay more soluble in the subsequent digestion step. The dust carried out of the kiln is removed in cyclone collectors and returned to the system. The hot clay is air-cooled in a rotary cooler and fed to the grinding mill which reduces the particle size to approximately 50-mesh or finer. The pulverized clay is stored in a concrete silo which serves as a feed bin to a clay-digestion system.

The digestion system is a series of four tanks operating in series, into which clay and fused ammonium bisulphate are fed simultaneously. This system is operated at a temperature slightly in excess of the boiling point of water, and a few hours of exposure, with agitation, allows dissolution of most of the available alumina in the clay. The slurry consists of dissolved ammonium alum and ammonium sulphate, together with soluble impurities and a suspension of inert solids, primarily silica. This mixture is pumped to a sands-washing system. This washing system is of the conventional counter-current rake type in six circular tanks. Four tanks in series take the underflow from the first two, which are in parallel. Hot liquor containing the ammonium alum and ammonium sulphate overflows from the first two tanks. Wash water is fed into one end of the four in series, and the solids at the other. The overflow from the washing system is returned to the plant circuit, and the waste mud containing the inerts is pumped to a sludge pond. If the economics of the recovery make it worth while, this mud can be treated with lime in order to get back the residual ammonia which the washing system has not removed.

Primary Purification

The liquor containing the aluminum salt must be purified, prior to the precipitation of the alumina. The primary purification system is a double crystallization of ammonium alum, which eliminates soluble impurities with the mother liquor. The most important impurity is iron. This iron must be in the reduced condition before crystallization of the alum. To accomplish this reduction of iron to the ferrous state, the liquor is treated with ammonium bisulphite in a small pressure autoclave.

The bisulphite is obtained by burning sulphur in a rotary Glen Falls burner. After cooling the sulphur dioxide in a spray tower, the bisulphite is formed in an absorption tower into which is introduced ammonia liquor.

After reduction of the iron, a vacuum crystallizer is used to cool the pregnant liquor and produce the alum crystals. Because of the extreme fineness of the silica which was produced in the digestion operation, it is not possible to completely clarify the liquors in the sands-washing operation. Therefore, a rake-type clarifier unit is used to separate the alum crystals from the mother liquor. This type of equipment will wash out the fine silica from the relatively large-size alum crystals at the same time that the mother liquor is removed. To assure the production of a pure alum crystal, the alum is redissolved and the crystallization and clarifying steps are repeated. The purified alum is redissolved to be fed as a solution to the aluminum hydroxide precipitation system. As a safeguard against possible accidental contamination with suspended solids, the redissolved liquor is passed through a clarifying filter press before the hydroxide precipitation operation.

Precipitation

In the precipitation step, high-strength aqua ammonia is added simultaneously with the alum liquor under conditions of controlled pH and temperature. To provide sufficient retention time in this precipitation system, eight tanks are used, operating in parallel. A number of tanks are used instead of one large tank because this operation must be conducted in pressure vessels in order to provide for temperatures above the boiling point at atmospheric pressure. These tanks are agitated to permit intimate mixing of the reactants, thus avoiding localized high concentration.

The slurry of precipitated aluminum hydroxide and ammonium sulphate in solution is cooled in a vacuum cooler in order to reduce the temperature sufficiently for vacuum filtration. Rotary filters are used to separate the aluminum hydroxide from the mother liquor. The cake-washing operation is accomplished through a reslurrying and refiltering of the first filter cake. This latter operation is repeated in order to assure a high washing efficiency. The final washed

Purpose of the Alumina-From-Clay Plant at Salem, Oreg.

THE "demonstration test plant" at Salem was designed not only to prove the ammonium bisulphate process of the Chemical Construction Corporation as applied to clays of the Northwest but also to determine the cost of such an operation on a commercial scale. Three other plants in the United States are similarly testing other processes for extracting alumina from crude materials other than bauxite. The special importance of the Salem plant lies in the fact that, of the several materials thus being tested, the group to which the generic name of clay is given is the most important one because deposits of clays are more widespread and more abundant than those of the other materials from which alumina might conceivably be extracted. The several clay deposits in the Pacific Northwest already investigated and drilled are large and of useful grade. The presence of other deposits of like nature is inferred by geologists. Even if the extraction of alumina from clay does not prove to be economic at present, the Government through its current program of testing will have a process available for use in an emergency.

The possiblity of establishing an integrated industry here is more apparent to the mining public now than it was when Columbia Metals Corporation made its plans three years ago and examined plant sites along the lower Columbia River. The recent rapid development of the airplane industry along the Pacific Coast illustrates one form of utilization available for aluminum produced here.

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cake is fed to a rotary calciner in which the hydroxide is completely dehydrated at temperatures reaching approximately 2,200° F. After calcination, the alumina is air-cooled in a rotary kiln. Considerable dusting can be anticipated in the rotary calciner, which necessitates the use of a cyclone dust collector and a scrubber system for the recovery of the dust.

Supplementary Flow Cycles

In addition to the direct flow of materials through the plant as described above, there are several supplementary cycles in the process for the purification and recovery of the raw materials used. Water of high purity is introduced on the last aluminum hydroxide filter and passes through the filter system countercurrent to the solids flow. This wash liquor is used for redissolving the final purified alum prior to its introduction into the precipitation system. The strong filtrate from the first filter, containing primarily ammonium sulphate, is returned to the second alum crystal clarifier as a wash and is then used for the initial alum re-solution. Wash water from the first filter is used for washing the alum in the first classifier.

This wash liquor which now contains the mother liquor from the first alum crystallization is returned to an oxidation tower into which are introduced air and ammonia. Iron is oxidized and immediately precipitated. A counter-current mud-washing system similar to the sands-washing unit separates the precipitated iron from the solution of ammonium sulphate. The liquor is clarified in a filter before going to a vacuum two-stage system for the formation of solid ammonium sulphate crystals.

Separating the Ammonium Sulphate

The ammonium sulphate crystals are separated from the magma in a battery of automatic continuous centrifuges and the liquor is returned to the system for reconcentration. The solid ammonium sulphate is carried on a conveyor belt to a feed-distribution system of a four-unit electric-furnace system. Variable screw conveyors feed the solid product into the electric furnaces. These furnaces are of the three-phase fused-salt-bath type in which the electrical resistance of the fused salt acts as the heating element. At a temperature of approximately 700° F. fused ammonium bisulphate is formed with the evolution of a chemical-equivalent amount of ammonia gas. The bisulphate flows into a trough and then into the digestion system for reaction with the clay, thus completing the cycle. The ammonia gas from the furnace is cooled and cleared of dust in a spray tower and coke box. This gas is recovered by absorption, redistillation, and condensation, giving a high-strength aqua ammonia for use in the precipitation system.

Make-up acid is received in tank cars and fed into the digestion system as required. Ammonia can be introduced into the furnace as ammonium sulphate, or aqua ammonia may also be added to the system. The relative amounts of the ammonia, sulphuric acid, or ammonium sulphate which will be needed depend upon the relative loss from the system of ammonia and sulphate. This will vary with clays of different composition.

Purging Impurities

Impurities such as potassium sulphate and other soluble inorganic salts will tend to accumulate in the mother liquor of the circulating system. In order to prevent these minor impurities from building up too far, it is necessary to purge the system. In order to recover the ammonia component of this purge, a means is provided for adding lime and distilling off ammonia gas which is then absorbed in the regular ammonia-recovery system. The points from which this purge is taken will depend upon the nature of the impurities; it may be taken from the aluminum hydroxide-filter filtrate or the ammonium sulphate-crystallizer mother liquor.

High Stacks

(*Continued from page* 25)

ences prevail during calms or near calms. *They indicate that at times of low wind velocity there is a tendency for smoke at the ground to drift in a different direction from that at higher elevations.* This phenomenon probably explains the ability of high stacks to effect satisfactory dispersion, in spite of the occurrence of calms.

Monthly Variations Before and After the Tall Stack

The Dillon point recorder has been operating continuously since April, 1934. The 605-ft. stack at Selby went into operation October 4, 1937. Figure 5 shows the average monthly concentrations of sulfur dioxide during 1936 and to October 4, 1937, also from that date to October, 1938. The higher average concentrations found during the summer months, in this and subsequent figures, are because of greater prevalence of wind in the direction of the recorder during those months rather than to other factors. The concentration of sulfur dioxide while the short stack was in operation averaged 0.057 p.p.m. from May, 1934, to October, 1937. It averaged 0.025 p.p.m. from October 4, 1937, after the tall stack was built, to December 31, 1938. The concentration, during 1,008 half-hour periods the plant was down averaged 0.013 p.p.m. The difference—the amount presumably contributed to the area by the Selby Smelter—averaged 0.012 p.p.m.

Figure 6 shows the frequency at which 0.5 plus p.p.m. was recorded by the Dillon autometer from January, 1936, to October, 1938. Note the tremendous drop following the construction of the 605-ft. stack. From May, 1934, to October, 1937, the sulfur dioxide exceeded 0.5 p.p.m. 842 times. The average of these 842 peaks was 0.717 p.p.m. The highest peak during this period was 3.6 p.p.m. Contrast that with this one peak of 0.52 p.p.m. during the following 15 months—the proof of the effectiveness of the high stack.

Figure 7 contrasts the frequency of three groups of sulfur dioxide concentrations at the Dillon recorder for 1936 with those from October, 1937, to October, 1938. The frequency of the low concentrations—0.02 to 0.19 p.p.m.—was about the same in each case. It represents the sulfur dioxide currently in the area. The frequency of 0.2 to 0.5 p.p.m. shown in the middle curve in 1936 totaled 1,354. With the operation of the tall stack in 1937, this frequency dropped to 169 for the year following, a decrease of nearly 90 percent. Contrast also the concentrations exceeding 0.5 p.p.m. totaling 362 for 1936 as against one from October, 1937, through December, 1938, shown in the lower curve.

Conclusion

High stacks coupled with high temperatures have largely solved the sulfur dioxide problem at many smelters. In addition they have vastly improved operating conditions by added draft.

The curves shown tend to corroborate the Bosanquet and Pearson formula of decrease of gas concentration proportional to the inverse square of stack height.

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Tipple of Ditney Hill mine, Ingle Coal Corporation, Elberfeld, Ind.

SHAFT SINKING By Stripping CHURN-DRILL Holes

By W. A. COLE

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One Method of Sinking an Auxiliary Shaft for Escape or Ventilation Purposes is to Strip Down a Borehole. The Ingle Coal Corporation Has Completed Two Such Shafts at Ditney Hill

AS THE mines get older and the active workings get farther and farther away from the original mine openings, it becomes increasingly difficult and expensive to ventilate most coal mines properly. At the same time, the avenues of escape for those employed underground have become so extended as often to make it impossible for them to make their way out of the mine in the event of a fire, mine explosion, or other emergency.

Where such conditions exist, the only satisfactory solution is to make new ventilation and emergency-escape openings near the active mine workings. At most mines this would necessitate sinking shafts, which is often slow and expensive.

The problem of relatively inexpensive as well as relatively expeditious shaft sinking under favorable conditions, which are not unusual in the Central States coal region, has been solved at one mine in southern Indiana.

This paper describes the method of sinking shafts by stripping small-diameter churn-drill holes as employed at the Ditney Hill mine of the Ingle Coal Corporation, Elberfeld, Warrick County, Ind.

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An idea of the general appearance of the lining is obtained from this view looking upward

General Discussion

Two vertical, 8-ft. diameter, steel-plate-lined mine shafts were sunk at this mine by stripping a 12-in. diameter churn-drill hole in each, into which the muck was shoveled and dropped to the mine workings below; it was then loaded mechanically at the bottom of the churn-drill hole. This method was employed in sinking an air shaft 97 ft. deep in 1940 and an emergency escape shaft to a depth of 147 ft. in 1942. The air shaft is near the mine slope, and the escape shaft is approximately half a mile northeast of the slope.

The formation of the Ditney Hill mine is a hard, gray shale or sandy shale overlying the coal. Surface soil and clay to a depth of 12 ft. were encountered in both shafts. Water seepage did not amount to more than 300 gallons in 24 hours in either shaft.

Cycle of Operations

The procedure in the construction of the shafts was as follows:

1. A 12-in. diameter churn-drill hole was first put down at the shaft site to a mine room or entry below. Care was taken in the drilling to keep the hole centered in the proposed shaft.
2. The soil and clay was excavated to a solid ledge, and the ground was supported by temporary timbers or concrete.
3. A bearing set of steel rails was placed on the shaft collar, and a ring of steel lining plates was bolted to the bearers with heavy steel hangers. Additional steel lining plates were then bolted in place down to the ledge.
4. Rock was drilled and blasted in such a manner that suitable fragmentation was obtained to permit the free running of the muck through the churn-drill hole upon being shoveled into the hole.
5. The shaft was lined by bolting the steel plates in place as the excavation deepened. The lining was kept as near the bottom of the excavation as possible.
6. The muck that accumulated in the mine at the bottom of the churn-drill hole was loaded mechanically and unloaded in abandoned rooms.
7. The voids behind the steel lining were filled with concrete or grout as required by the character of the ground and water conditions.

Shaft-Sinking Details

A tripod was erected over the shaft, and hoisting was done in a 5-cu. ft. bucket attached to a cable.

Shaft Collar

In sinking the air shaft, the overburden was excavated by hand shoveling to a convenient depth for throwing the material out of the hole. An attempt was made to drop the remainder of the overburden through the churn-drill hole, which resulted in clogging the hole.

In sinking the escape shaft, the overburden was excavated to solid shale, the opening was lined with concrete. The concrete walls have a minimum thickness of 1 ft., with a footing provided by cutting a hitch in the solid shale. The cross-sectional inside dimensions of the collar are 9 ft. 2 in. by 9 ft. 2 in., which allowed a minimum clearance of 6 inches between the concrete walls and the steel lining. The space between the concrete walls and the steel lining was filled with concrete upon completion of the sinking operations.

The bearing set from which the steel lining was hung consisted of two 60-pound steel rails placed across the top of the concrete collar and two cross rails welded between the longer ones.

Drilling and Blasting

The rock was drilled in 2-ft. rounds with a Thor jackhammer operated by compressed air supplied by a small portable air compressor.

The typical round was drilled with the holes located in two circles as shown in figure 1. The inner circle of 5 holes was 15 inches from the churn-drill hole, whereas the outer circle of 11 holes was started as close to the lining as drilling permitted and was bottomed within the neat line of the excavation.

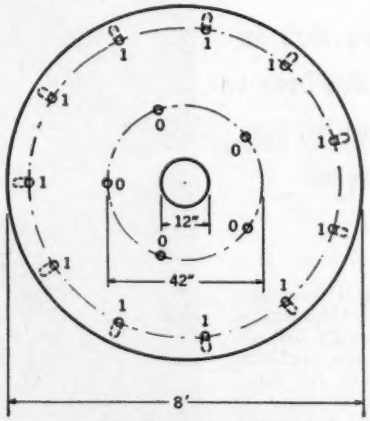

Fig. 1. Typical drill round for 8-ft.-diameter shaft

Forty-percent dynamite was used. The entire round was fired electrically at the same time by using instantaneous electric detonators in the outer circle of holes.

Two 10-ft. lengths of 40-lb. rails suspended on a cable were hung in the churn-drill hole so that part of the rails extended out of the hole when a round was shot. The rails allowed only the finely broken rock to pass and prevented plugging of the drill hole by the blast; after the blast, the hole could be opened easily by shaking the cable.

Mucking

The muck was removed from the shaft by shoveling it into the churn-drill hole.

A No. 7 BU Joy loader was used for loading mine cars at the bottom of the churn-drill hole. The muck was loaded once a day, which required virtually one shift each 24 hours for a crew of one loading-machine operator and two car men.

Shaft Lining

A ring of liner plates was placed in the shaft as soon as the muck was removed after blasting.

Armco steel liner plates manufactured by the American Rolling Mill Co., of Middletown, Ohio, were used in these shafts. The plates are structural units of corrugated metal with corrugation 7 in. wide and 1¾ in. deep. The corrugations extend the full length of the plate, which is flanged along each side to a depth of 1¾ in. The full standard plate has a covering length of 50¼ in. on the neutral axis, allowing for the 3-in. end lap. The width of the plate is 18 in. Fractional plates are available.

Each section of the plate is curved to conform to specifications for the individual job. Plates are rolled for various diameters from 48 to 160 in. It requires six full plates to make a full-circle lining having a 96-in. diameter on the neutral axis, the cross-sectional dimension of the vertical shafts at the Ditney Hill mine.

The steel plate linings are supplied in standard gages from No. 3 to No. 14, depending on the load the lining must support. Plates used in the Ditney Hill shalts are No. 10 gage.

One end of the plate is offset to allow for the lap of the end joint. The offset depth is equal to the thickness of the metal. The overlap of the plates is 3 in. Five ½-in. bolts are staggered at the lap end of the plate, the bolt heads being welded in place.

Plates with bolts at both ends and plates provided with holes only at both ends are supplied for inside erection. The erection of a full circle set of plates in a shaft is started with a plate having bolts at both ends. The last plate to complete the ring has bolt holes at both ends and can be fitted easily over the bolts in the adjoining plates.

Four holes for ½-in. bolts are provided in each flange of the full plate. The flanges of two adjacent rings are bolted together to form horizontal joints at 18-in. intervals. The strength of the bolts determines the weight of liner plates that can be supported from one bearing set.

The end joints of the plates are staggered on adjacent rings, as shown in Figure 2.

The steel liner plates used in the shafts at the Ditney Hill mine are

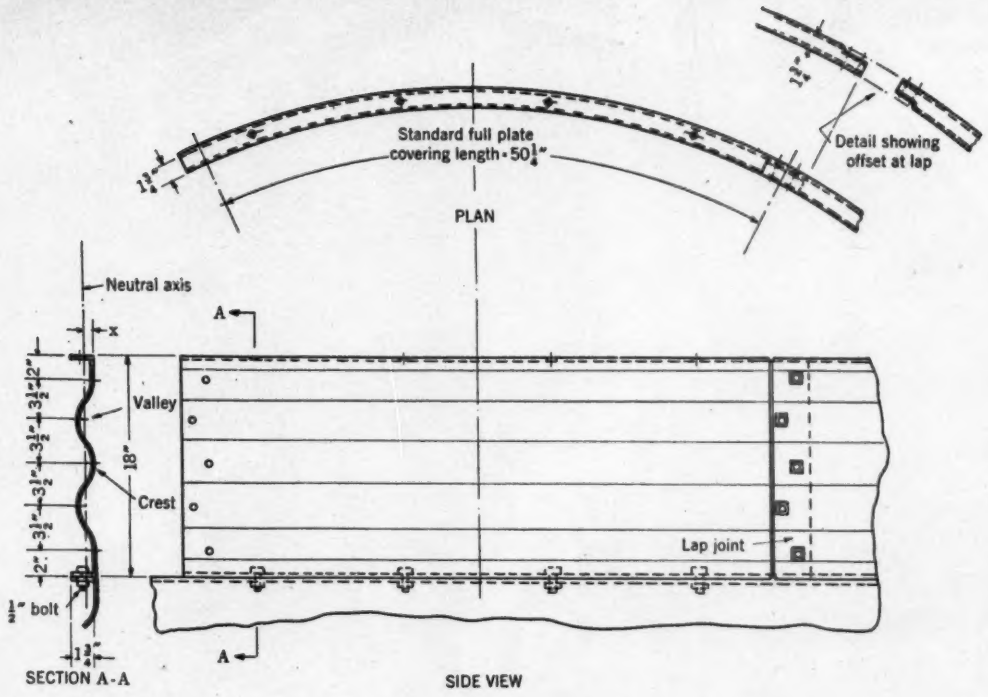

Fig. 2. Steel liner plate details

made of galvanized Armco ingot iron provided with a special asbestos-bonded bituminous coating on both sides. The plates are processed by pressing a layer of asbestos felt into the molten zinc coating as the flat plates emerge from the galvanizing rolls. The porous mass of fibers on the plates is then saturated thoroughly with a bituminous material, after which the plates are corrugated, formed, and coated with bitumen.

Sinking Progress

The work in the shafts was done on a three-shifts-a-day basis with three men on each shift. Exclusive of the collar work, the air shaft was sunk in 10 days and the escape shaft in 15 days.

Costs

The air shaft was sunk when construction wages were in force. The higher mining-wage scale established for all employes was in effect when the escape shaft was sunk. As the present hourly rate for a similar crew averages $1, this figure was used in estimating the labor cost given in the summary below.

The steel-plate liners cost $11.25 per lin. ft. of shaft delivered at the mine in 1940 and $13.67 in 1942.

Conclusions

The size of the center hole should be increased to prevent plugging by muck if the shaft is wet and the character of the muck is such that it

(*Continued on page* 66)

TABLE 1—PROPERTIES AND WEIGHTS, AMERICAN ROLLING MILL CO., CONSTRUCTION PLATE LININGS *

Gage	Thickness, in.	Area, sq. in.	Moment of inertia Per in.	Moment of inertia Per section	Section modulus Per in.	Section modulus Per section
14.....	0.0781	1.823	0.03847	0.6925	0.0363	0.6533
12.....	.1093	2.550	.0534	.9613	.0498	.8967
10.....	.141	3.281	.0692	1.245	.0636	1.1443
8.....	.172	4.014	.0839	1.510	.0763	1.374
7.....	.188	4.388	.0919	1.655	.0833	1.499
5.....	.219	5.110	.1071	1.928	.0958	1.7245
3.....	.250	5.835	.1225	2.205	.1076	1.9376

Gage	Radius of gyration	X	Approximate standard plate weights, including bolts, pounds Full size	¾ size	½ size
14.....	0.615	0.768	30	23	16
12.....	.614	.787	40	31	22
10.....	.614	.803	51	39	27
8.....	.614	.823	61	47	33
7.....	.614	.834	67	51	36
5.....	.614	.851	77	59	41
3.....	.614	.862	88	68	47

* Data taken from bulletin of American Rolling Mill Co.

ESCAPE-SHAFT COSTS, BASED ON 147 FT. OF SHAFT

	Cost per linear foot
Churn-drill hole	$2.25
Concrete collar and steel bearers	4.50
Direct labor (wages and insurance)	10.58
Liner plates	13.67
Explosives and supplies	3.67
	$34.67

Supervision, overhead, and equipment rentals are not included in this table.

Joy Loader filling a mine car directly from floor.

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FRANKLIN, PA.

Taxation and Employment

By HENRY B. FERNALD

Chairman, Tax Committee
American Mining Congress

The Postwar Employment Problem is Intimately Related to Taxation. In the Trying Days Still Ahead of Us, We Must Retain the Fundamental Concepts of Democracy and Free Enterprise if We Would Build a Solid Foundation of Permanent Jobs for the Maximum Number of Americans

WE ARE thinking of this subject of taxation and employment today when we are in the midst of war, the winning of which is our first objective. Speaking to you here a year ago I said—

"We must win this war. Nothing else, present or future, compares in importance. We must win as quickly as possible to curtail the damage and destruction, the loss of life and property and the loss of liberty which war involves, and to bring as soon as we can the time of peace."

Nothing that has happened since has changed that primary and all-important first objective. We have made progress. Much in the last year is encouraging, but we are still in a war which is not yet finished. War is not won until it is ended, and we cannot afford to let down in any way on our war effort until the war is fully won. Nothing we say or do in plans for the future should mean any let-down in war effort on the fighting fronts or in furnishing to the fighting fronts what is needed to win the war as quickly as it can be won.

Faults in Existing Tax Laws

To whatever extent present tax laws and administration or other measures in effect are needed to help to win the war, there is no question but they should be continued. To the extent they obstruct or deter war effort they should be immediately and effectively changed. Tax laws are made and administered by human beings liable to error. However high and lofty motives may be, whatever slogans may be used to justify them, what is done may still be unwise and may hurt rather than help war objectives. The power of democracy is that under it those in the common walks of life who see things which are wrongly done can point out errors made and needed remedies. So it is right for us to speak of faults in our tax laws which ought to be promptly remedied so they will not hurt the prosecution of the war, and of provisions of our tax laws or administration which, without helping the prosecution of the war, hurt the foundation for a future peacetime world.

We have no thought that during the war years we shall raise enough in revenues to pay for war expenditures. The more we now raise in revenues the less of debt we shall have to carry forward as a peacetime burden, but we should not, in striving for the last dollar of present revenue, hurt our war effort nor unnecessarily impair our revenue and employment sources of the future. War inevitably brings waste and destruction, hardship and suffering. Let us try to make it no worse than it need be.

It did not help the war effort when the inexcusable mess was made of individual income taxes, which has been considerably improved as a result of taxpayers' protests. No one knows how much time and thought and effort was wasted which might have gone to something more worth while. We cannot make income taxation simple and agreeable, but we can try to avoid unnecessary complications and difficulties and taxpayers' protests help to do that.

In war we cannot have the standards of peace for taxation any more than for other activities. Yet, even in the war, we can rightly look to see how far we need depart from the standards which in time of peace will give the kind of world we want.

Employment the Major Post-War Problem

In that post-war picture, the foremost problem in the minds of everyone is that of employment—employment for millions released from the war services and employment for many more millions released from wartime jobs—not merely temporary employment or made work, but useful places in industry, with an outlook for the future.

Our worry will not then be to find enough employes to meet the employment demand, but to find employers to give employment to all who wish it and should have it. This problem can only be solved as there is a reasonable incentive to give employment. That incentive will only exist if there is expectation of a profit commensurate with the effort, the capital, and the risk in giving employment and in furnishing the means for employment. The risk is not merely in the wage payments, but employment generally requires plant and equipment, materials and supplies and other working capital which must be made available before employment can be given. There is time to be bridged between the starting of production and the realization upon the output. There is a far longer time between the investment in plant and equipment and recoupment of that investment from the proceeds to which it gives rise.

New Capital Required

There are cases where little capital is required to give employment but generally in modern industry a sub-

Presented before the Colorado Mining Association, Denver, Colo., January 27, 1945.

stantial investment of capital must be made and maintained to furnish employment. The relative amount will vary in different cases but the amount required for plant and equipment, inventories, receivables, cash, and other assets is apt to be from 1 to 3 dollars of capital employed for each dollar of annual wages. In other words, $100,000 of annual payroll is likely to require that $100,000 to $300,000 or more of capital shall have been made available by investment in the business, by loans or credits, or in facilities the business may use for hire.

We are looking for full employment in this country which may involve wages about twice our prewar wage total. Investments already made can supply part of this employment, and we may expect they will be so employed if reasonable incentive exists. However, much of the plant, equipment and inventories for war production will be wholly valueless for peace employment, or can be made available only by further expenditures for conversion and reconstruction. Much of our prewar plant has become obsolete or of limited usefulness and should be replaced. But even with great expenditures made for plants and equipment, we cannot expect full employment will be given and maintained merely through existing enterprises. We must have new enterprises and new employment opportunities continually supplied; which means continuing new investment. We cannot expect the needed investment will be made except in the expectation of a profit to be earned therefrom.

Mining Employment Dependent on Adequate Incentive

We cannot expect our mines to operate and give employment in production of needed metals unless there is prospect that, after taxes, an adequate profit will be left to the mining employer and investor. But we must look further and see that we cannot expect prosperity for the mines unless there is adequate incentive left, after taxes, for those who would use the products of our mines. If we must look ahead to inadequate profit incentive for the mines themselves or for industry in general, mining production and employment will suffer. Government revenues will also suffer as there is a reduction of the incomes from which the revenues can be derived. Taxes which leave no incentive for investment, production and employment, cannot long continue to yield substantial revenues.

Our wartime taxation is no precedent for the time of peace. We have raised unprecedented amounts with excessive rates during the war, but we have only been raising one-half or less of what the Government itself has been spending. Where taxes have made investment unattractive to private capital, the Government has been ready to furnish the capital needed for war effort. These and all the other aspects of our war economy, however necessary in time of war, are not precedents for peace.

We Must Adhere to Fundamental Concepts

There are many details of the post-war program that can only be filled in as we see more clearly the situations we must meet. There are uncertainties as to just what wise judgment and opinion may then dictate. Yet there are certain fundamentals which we should have clearly in mind. If we do, I am not much disturbed as to our possible differences in judgment as to the exact measures which should be taken. If we are in agreement that we want our system of private industry, investment and employment to continue and that it can only continue if adequate profit incentive is allowed for investment and employment, I am not much disturbed as to our differences in reasonably informed opinion as to where the exact line will fall for allowing that incentive. I am doubtful of judgments of those who feel the profit incentive has no place in business economy; or of the judgments of those who have never made or expect to make their own investments to furnish production and employment or have never known and never expect to bear the burden of themselves meeting payrolls and administering business enterprises and who are unwilling to learn from those who have done or expect to do these things. We know from bitter experience that provisions of tax laws thoughtlessly, ignorantly, or unwisely imposed or applied can be just as effective in killing investment or employment incentive as if this had been the intention of the Government or those who act with its authority.

I am speaking particularly regarding taxes because if taxes are such as not to leave incentive for investment, production and employment, we need little consider other factors. Taxes may, however, only be part of a discouraging cumulative load, the aggregate of which, rather than any single factor, may make the fatal obstruction.

The Proper Framing of Government Policy

We might also refer to laws or rules or Government dictates as to sales of securities, and as to labor and employment and price and production controls. We can recognize the right and power of the Government to deal with these subjects and yet ask that it consider as to each action it takes "Will this action encourage rather than discourage investment, production and employment?", "Will the practical result of this be a benefit sufficient to offset whatever effect it may have in discouraging the investment, production and employment we need?"

Let us assume then that the investor and the employer are recognized as essential for the production, the employment and the Government revenues we need in the post-war period and that other Government policies will be framed to encourage and not discourage them. Then we may look at our post-war tax problem and the requirements for meeting it.

Revenues in unprecedented amounts will be required for many years, even if we ruthlessly cut out waste, extravagance and unnecessary expenditures of our Government, as we should do. We shall only meet these requirements by having maximum business activities and incomes from which revenues may be obtained. Taxes which in their nature and amount, or as they are administered, leave inadequate incentive do not yield long-term maximum revenues.

Changes Are Needed

Let us look then at some of the changes we need to make. I shall speak first of our tax laws as applied to industry and investments in general. Taxes on mines must fall within the framework of our general tax system. To whatever extent there are special features of mining which differ from those of ordinary industry they should be recognized and have their appropriate treatment, but most of the provisions of our tax laws and their administration which affect mining are those common to all industry. We cannot expect fair and equitable treatment for mines unless the law and its administration are fair and equitable to industry in general. Even for the special problems of mines, we cannot expect appropriate treatment within the framework of a tax system which does not deal fairly with general business. We have encountered the argument that our tax laws deal no more unfairly with mines than with other industry. Whether or not we agree with this, our answer must be, "Deal fairly with mines and deal fairly with other industry. Do not try to balance injustice with injustice, but deal fairly with all. That is the only way in which the Government can get the long-term revenues it needs."

What are some of the things needed in the long-term tax program?

(1) The excess profits tax should be repealed. It is essentially inequitable and discriminatory and suppressive of development and expansion. Justified only by war emergency, it has no place in peacetime economy. Its repeal, effective on termination of hostilities, should be promptly enacted by Congress, so post-war plans can be made in advance with assurance

(*Continued on page* 44)

RECORD

Main slope conveyor carries run-of-mine coal from underground hopper to top of preparation plant. Capacity 1,000 TPH. Belt is U.S. Matchless grade, 54 in. wide, 7-ply, 42-oz. duck; covers: top, 1/4 in., bottom, 1/16 in.

this tax will not then be in effect. We cannot afford the delay in post-war plans which would result if action on repeal of this tax is left until some later date.

(2) Maximum tax rates should not pass the point where they will leave incentive for investment and business activity. A tax rate of 90 percent, even of 75 percent, leaves little incentive for the taxpayer to have income subject to such rates. A 50 percent tax rate seems about the maximum we can impose and still leave reasonable incentive. Even a 50 percent tax rate for the individual on income already subjected to a 40 percent corporate tax is too high. It is not that the income has been taxed twice, but that the aggregate effect of the cumulative taxes passes the incentive point. We can have a reasonable corporate tax rate if, in one way or another, we will then provide that any further tax on dividends received by the stockholder does not make a cumulative tax load which will seriously impair the incentive for investment.

Fixing our maximum rates on this basis, we can then scale down to lower rates on lower incomes, nowhere passing the point of maximum productivity of long-range taxation.

(3) We should have nothing in the nature of an undistributed profits tax on earnings retained by the corporation for proper business use. We undoubtedly must retain the special tax on unreasonable profit accumulation beyond the needs of the business, but no tax should be imposed because profits are withheld from distribution for business use. As we know from experience (under the 1936 tax law) any such tax seriously retards development and expansion. It particularly hurts those trying to develop a mine or build up any other business without large capital reserves.

Some of the plans being urged to tax corporations only on earnings not distributed to stockholders have the effect of an undistributed profits tax. Better tax all corporate earnings at a reasonable flat rate, regardless of whether distributed or undistributed, than to impose a tax which will penalize earnings retained for business use. Impose the flat tax on corporate earnings and then make appropriate allowance to the stockholder so that the cumulative tax shall not be excessive.

(4) Make adequate allowance for capital return, so an income tax shall not become a tax on capital. Under this broad heading we can note the following special features:

(a) Reasonable and adequate deductions for depreciation should be effectively allowed in computing taxable income. The law provides for a reasonable allowance but it also makes the Commissioner's determination final unless the taxpayer, on appeal to the courts, can bear the burden of proof that the Commissioner's determination was not reasonable. This is a difficult, time-consuming procedure. I think the rule should simply be reversed, and depreciation claimed by the taxpayer should be allowed unless the Commissioner can bear the burden of proof to establish that the amount claimed by the taxpayer was not reasonable. I know no reason why this should not be done.

The "tax benefit rule" should be recognized, so no depreciation would be considered as allowed unless it were effective in reducing the net income subject to tax. The doctrine that depreciation is as much chargeable against losses as against profits is contrary to the fundamental fact that recovery of investment can only be made out of profits, never out of losses.

(b) Full allowance in computing taxable income should be made for the losses of loss years. The present net loss provisions to a considerable and commendable extent make such allowance, but with limitations which in many cases deny and impair the full allowance. The fact that a taxpayer has had allowances for discovery or percentage depletion, or has had dividends or tax-free income, is no adequate reason for abridging or denying the effective deduction of losses sustained from taxable income.

(c) Depletion should be fully and effectively allowed. What I have said as to depreciation is to a considerable extent applicable to depletion. Percentage depletion was intended to be a fair but simple method of capital allowance. We still need to find means to keep it from being encumbered with a mass of confusing technicalities. I think we have made some progress to this end, in which your Senator Johnson has so greatly helped. I wish we could get more people to see that it is not solely in the interest of mining taxpayers, but also in the interest of the public at large and of the Government itself that adequate capital allowance should be made to mines, because without this there can be no adequate incentive for mining investment and operation.

Furthermore, we ought to make better allowance than we now have for tax exemption to stockholders for distributions which really represent return to them of their capital investments.

(d) Development should be fully and effectively allowed in computing taxable income. The so-called "development" expenditures of mines are generally nothing more than prepaid operating expenses, and should be fully and effectively allowed as such.

(5) We should strive for tax laws and regulations that taxpayers can understand and administrative procedure as little bothersome to them as it can practically be made. We should aim for tax laws and rulings which can be continued for some time without substantial change.

Uncertainties do not make for confidence. Laws which taxpayers and tax administrators cannot reasonably understand; prospects that the law and interpretation of today will not be that of tomorrow or next year; or uncertainties or difficulties in administrative procedure do not lay good foundations for investment or business action.

Better Too Early Than Too Late

We might continue with the discussion of many other items. Those I have mentioned are illustrative, rather than complete, to indicate what needs to be done to give tax laws under which there will be reasonable incentive for investors and employers to make the investments and give the employment we should have in the post-war period.

Some things might be done, effective immediately or even with retroactive effect, and should be promptly done if they will not hurt the war effort. Whatever we can wisely do to evidence the Government's intent that its taxes shall not be such as to leave inadequate incentive for business investment and employment in the post-war years will be progress. We had better be too early than too late in laying proper foundations for post-war employment. We should not do anything which will be harmful to the war effort, but generally the war effort will be helped, rather than harmed, by greater confidence in the effectiveness of post-war plans.

Science Talent Search Awards

A boy and a girl of Brooklyn, N. Y., have each received a $2,400 Westinghouse Science Scholarship, top awards in the Fourth Annual Science Talent Search. They are Marion Cecile Joswick, graduate of Brooklyn's Manual Training High School, who at 17 is already at work on war research for the Army, and Edward Malcolm Kosower, 16, a senior at Stuyvesant High School in Manhattan.

The judges, making the awards to the 40 student delegates attending the five-day Institute of the Science Talent Search in Washington, chose one girl and seven boys to receive four-year $400 Westinghouse Science Scholarships. The 30 other young scientists received one-year Westinghouse Science Scholarships worth $100 each. A total of $11,000 in Scholarships is awarded each year in the Science Talent Search, which is conducted by Science Clubs of America.

MISSABE MOUNTAIN Mine

Missabe Mountain mine—looking S.E. into Lone Jack trough. City of Virginia pumping plant at right. N.E. wall operations at upper center

This Great Producer Which Has Contributed Over $16,000,000 to Minnesota's Trust Fund and Nearly 70,000,000 Tons of High Grade Iron Ore to the Nation's Wealth is Completing Its Final Operating Stages by Means of Belt Conveyors and Trucks

By VICTOR K. TAIPALE
Chief Engineer
Charleson Iron Mining Co.

THE Charleson Iron Mining Company of Hibbing, Minn., of which E. F. Remer is president and C. H. Remer vice president and general superintendent, enjoyed the most successful season in its 11-year history of mining operations during 1944. This company, pioneer in many of the new developments both in open pit mining and washing plant methods, is operating the Missabe Mountain Mine, an open pit property, located at Virginia, Minn. The ore mined is a direct shipping ore needing no treatment of any kind except for crushing.

Operations of the Missabe Mountain Mine are under the guidance of Clark Henry, who has had a wide range of mining experience on the Mesabi Iron Range, Tri-State Field and in the Canadian mineral mines. Before coming to the Charleson Iron Mining Company, he was general superintendent for Siems-Drake Puget Sound Company at the Naval Air Station on Kodiak Island, Alaska.

Personnel number 150 to 160 men, with 98 percent in the skilled labor classification.

In June, 1942, the Charleson Iron Mining Company entered into a 25-year lease with the state of Minnesota, owner in fee, to mine the estimated 7,500,000 tons of remaining ore. The lease terms provide for a sliding scale of royalties running from $0.63 to $1.53 per ton, depending upon the dry iron content of the ore and method of mining, whether underground or open pit.

Mine a Big Producer

Previous to the new lease to the Charleson Iron Mining Company, a total of 66,407,509 tons of iron ore had been shipped from this property by a former lease holder and has yielded into the state's trust fund

$16,604,118.38 in royalties, besides paying the occupational and ad valorem taxes.

During the 1943 ore season, the Charleson Iron Mining Company shipped 996,580 tons of iron ore plus 101,000 tons of trespass ore. The shipments of Non-Bessemer and Bessemer ores and laboratory analysis appear in the adjoining table.

At the close of the 1944 season the Missabe Mountain Mine has produced 1,209,000 tons of ore plus 54,600 tons of trespass and special grade ores.

	Tons	Fe.	Phos.	Sil.	Mo.	Al.	Moist.	Fe. Nat'l
Non-Bessemer	643,120	58.01	.070	9.46	0.52	2.06	12.17	50.96
Bessemer	353,460	60.22	.042	9.13	0.35	1.20	9.91	54.25

Mine Buildings

Facilities for truck and shovel repairs are housed in a wood frame building 42 ft. by 110 ft., which gives ample room for repairs to two shovels and three trucks at one time. The garage is heated to about 45 degrees Fahrenheit during the winter, which is found to create favorable working conditions.

Separate buildings for each of the following have been erected: welding shop, blacksmith shop, carpenter shop and two warehouses.

Equipment and Operating Conditions

Ore in the Missabe Mountain Mine lies principally in track benches, varying from 35 to 120 ft. in width, left standing from previous operations by a rail haulage system which used steam locomotives. The depth of the pit, 440 ft., had reached a point where it became necessary to use a truck and conveyor system or some other alternative with smaller shovel equipment to mine the track benches.

Blast hole and exploration work is done by two 26-T and one 27-T Bucyrus-Erie Churn Drills. The average blast hole, 6 in. in diameter, is drilled to a depth of 35 ft. which when blasted, gives two 15-ft. shovel cuts. Exploration, with casing, to depths of 50 to 75 ft., has been done during the operating season and extensive exploration is planned for the winter months.

Present shovel equipment consists of three Bucyrus-Erie shovels, two 1½ cu. yd. and one 1¼ cu. yd. capacity and one Marion Diesel-electric 1¾ cu. yd. capacity.

Hauling is done by seven 15-ton, rear dump Euclid trucks, with the haul ranging from 1,000 to 7,800 ft. Fleets of seven 8-ton dual-drive rear-end Fords are used on the short hauls and for the moving of rock.

Loading pocket at upper left receives ore from inclined conveyo · which passes underground with its load from ramp at right center. Shops, warehouse, garage, etc., are conveniently located in the pit

The Conveyor System

The ore is hauled to a central pocket of 60-ton capacity in the pit, from whence the ore is fed by a 48-in. by 12-ft. pan feeder to a grizzly. Openings on the grizzly are set at a maximum of 4 in. with the oversize dropping into a 48-in. by 36-in. jaw crusher

with a maximum jaw opening set at 6 in. Undersize from the grizzly drops through a chute to a 30-in. conveyor belt to form a cushion for the crushed product, thus protecting the belt from cutting and severe abrasion by the coarse product.

The original layout for the 1943 season consisted of three flights in the conveyor system. The first, powered by a 60-hp. gear motor, had a length of 293 ft. on centers, with a 250-ft. radius curve near the loading point and on a 19°-5′ slope. The second flight, powered with a similar 60-hp. gear motor, was on 255-ft. centers with a slope of 18°-30′. The third flight, 362 ft. on centers, 18°-26′ slope, was powered by a 100-hp. motor with a combination V-belt and roller chain drive through a counter shaft.

Conveyor Transfer Points

Transfers were so placed that the drop from the top of the head pulley to the lower belt was only 41 in. No chutes were necessary, but an attendant at each of the two transfers on each of the three shifts was found to be necessary.

Much difficulty was encountered at each of the transfer points. When wet and sticky material was being conveyed, the tendency was to build up underneath the snub and first return pulleys. Also, if a slab became wedged between the skirt boards this caused a plugging of the conveyor system at that point with a possible injury to the belt. Fabric belts were originally used throughout the conveyor system.

Experience revealed that it cost from $6,000 to $10,000 per year to operate and maintain each transfer. With the manpower situation being critical at this time, it was deemed best that a single lift conveyor system be substituted.

Cord Belt Chosen for Single Lift

Following exhaustive studies of all conveyor belts upon the market, it was found that the B. F. Goodrich Company cord belt best fitted into the proposed system to be installed for the 1944 ore season.

This cord conveyor belt is 30 in. in width, had ¼-in. top cover with a transcord breaker strip, thence six cord plies, two fabric plies of 42-oz. duck and a 1/16-in. bottom cover, weighing 11 pounds per foot. A synthetic rubber compound, known as GR-S, is used in the friction and both cover stocks.

Length of the conveyor is 946 ft. on centers with a lift of 272 ft. The load is put on the conveyor on a plus 4.00 percent grade, thence on a 500-ft. radius curve to a tangent, whose maximum slope is 18°-33′, to the head pulley. This conveyor system is the highest single lift belt on the Iron Ranges at the present time. The belt tension is 60 pounds per inch per ply, well within the limits of the cord belt.

There are 1,905 lin. ft. of conveyor belting with two vulcanized step splices as perfected by the Goodrich Company. The splices are made on a 22° bias with 6-in. steps on each of the six cord plies and two fabric plies. The splice is cured with the heat from an electric vulcanizer, with the total time to make a splice ranging from 16 to 20 hours.

Conveyor Loading Points

At the loading points of the fine and coarse material, Robins "Rubberdisc" cushion idlers are used. The troughing idlers on the conveyor system are of the three-pulley type, 5-in. diameter, roller bearing equipped

ing N.W. from a high point of rock shows complete conveyor layout. The new 30-in. belt is laid out for 946-ft. centers and a lift of 272 ft.

throughout. Spacing of the troughing idlers varies from 12 in. at the bottom to 54 in. at the top and these are set perpendicular to the belt. Also, at equal intervals there are four guide idlers, placed to insure correct travel of the belt in case the loading is off center, which happens at times when the ore chute is plugged. Varied spacing of the troughing idlers was determined from the load, belt tension and inclination of conveyor. For the return side the spacing of the idlers is varied, also, from a minimum of 8 ft. to a maximum of 11 ft. at the top end, with eight guide idlers placed at equal intervals.

V-Belt Drive

The conveyor drive mounted at the head end is unique in that only V-belts are used. This idea of V-belt drive is credited to C. H. Remer, general superintendent of the Charleson Iron Mining Company. This particular drive came about by our not being able to obtain delivery of a motorized gear reducer of the proper capacity within the specified length of time. From operations it has been found that this V-belt drive is very flexible and easy on the operations of the conveyor despite its cumbersome size and area necessary.

The starting equipment is a manual drum control, with 10 starting points. A 200 h.p. slip ring 440-volt A.C. motor, is connected to the driving shaft by a flexible coupling upon which shaft are mounted two Link-Belt 12-in. differential back-stops, and an 18 D-groove pulley of 13.4-in. P.D. Through the 18 D-300 V-belts, a 79-in. diameter flat pulley mounted on a 5 7/16-in. countershaft is driven. On each end of the 5 7/16-in. countershaft, there is a 20 D-groove pulley of 19.0 P.D. The power from the 19.0-in. P.D. pulley is transmitted by 40 D-300 V-belts, 20 on each side, to two 84-in. diameter flat cast pulleys mounted on a 7-in. diameter head shaft. One of the 84-in. diameter pulleys has extra width for a differential brake mounting for additional safety in case of power failure with a loaded belt.

A crowned head pulley of 48-in. diameter, has a 3-ply special rough coated lagging. The conveyor belt has a 253° wrap on the head pulley with a 36-in. snub pulley adjacent to it. A tail pulley, 36 in. in diameter, is mounted on a horizontal sliding carriage, with a 1,500-lb. counterweight attached to the carriage by wire rope over a series of sheaves.

Belt Capacity

Conveyor belt capacity is rated at 550 short tons per hour at 550 ft. per minute, handling a material of minus 6 in., which material weighs from 125 to 150 lb. per cu. ft. The belt has been operated up to a maximum of 600 tons per hour for short intervals during the season with an average of 7,500 to 10,000 tons per 24-hour day. The ore is dropped into a loading pocket directly underneath the head pulley.

Loading Pocket Conditions

The loading pocket has a capacity of 150 tons of ore whence it is loaded directly into bottom dump standard railroad type ore cars of 50 to 75 tons capacity. The flow of ore from the pocket is controlled by air operated cylinders opening and closing a sliding gate set an an incline.

Ore cars are moved from a 50-car capacity empty track yard to the loading position by the loading operator at the pocket. He controls the movement and the loading of the cars with air controls. Compressed air is supplied from a 284-cu. ft. Ingersoll-Rand air compressor.

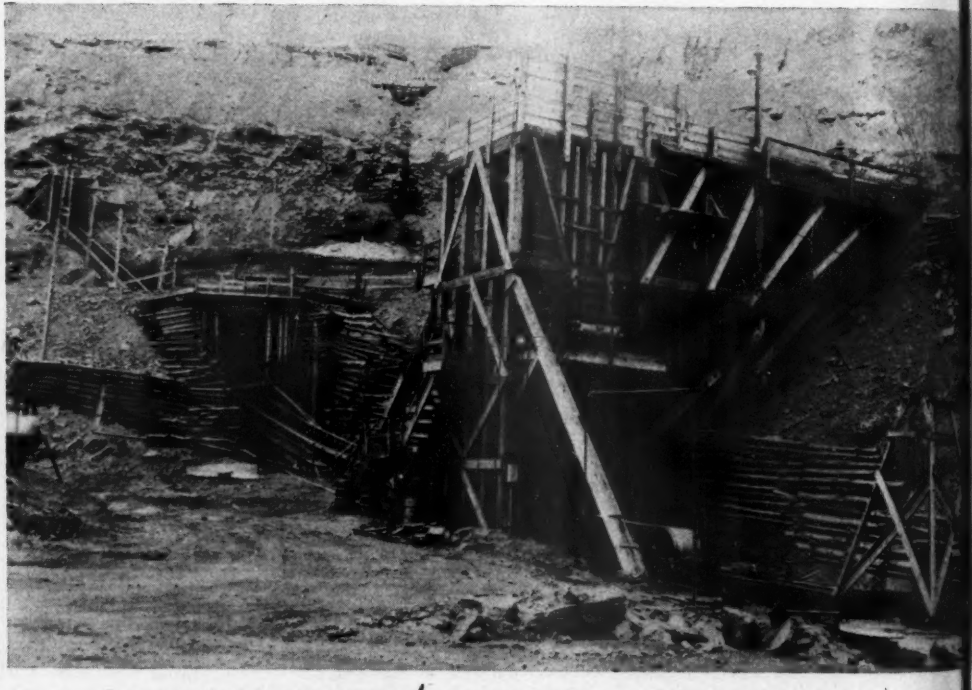
A sampler is employed to take samples of each car, five cars are combined for one sample and moisture determination is run on four samples or 20 cars by Lerch Brothers Laboratories, located nearby.

Pit Drainage and City Water Supply

Water problem in the Missabe Mountain pit is handled to the advantage of the city of Virginia and the Charleson Iron Mining Company. The city of Virginia, owns the pumping equipment, which consists of two 2,000 g.p.m. and one 1,200 g.p.m. pumps with boosters. The city uses this water for public water supply. Incoming water is at the rate of 2,500 to 3,000 g.p.m. continuously from the various strata, but more especially from a faulted area. During the spring run-off or heavy rainfalls, a maximum of 4,000 g.p.m. is pumped, with one pump kept in reserve to safeguard an adequate supply to the public water system. The capacity of the pit is such that it would take an unprecedented rainfall to drown out the pumps.

Total cost of pumping water from the Missabe Mountain pit amounts to $60,000 per year, which cost is borne proportionately by the Charleson Iron Mining Company and the city of Virginia.

Power for both mine and pump use is derived from the Minnesota Power and Light Company's power lines which extend throughout the entire Northern Minnesota iron ore area. Primary energy is furnished at 23,000 volts and then stepped down to the necessary voltage for general power.



Ore passes through ramp, crusher and feeder to belt. Note belt-tension counterweight at right. Portal for underground passageway at left

Measuring and Mapping MINE VENTILATION Systems

Recommendations to Give Better Air Distribution Underground

By WALTER E. HOUSMAN

Chairman Ventilation Committee
Coal Division, American Mining Congress

VENTILATION surveys should record both volume and pressure distribution if corrections and relief are to be applied intelligently. The few hundred dollars expended for a pair of altimeters may be returned many times in the more efficient use of the initial air volume as the result of a comprehensive pressure-volume survey. Recent developments in altimeters have brought out instruments easy to handle, rugged in construction, and simple to read.

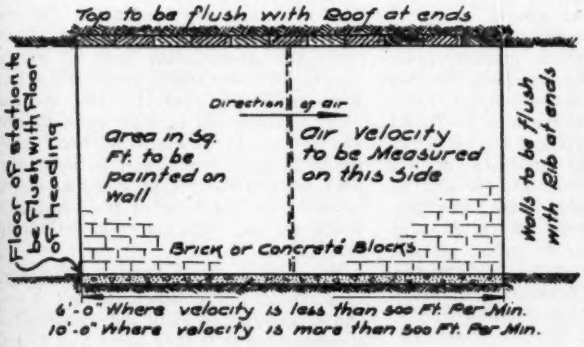
Since but 50 to 60 percent of the fan volume on the average is delivered to the working face, it does not require an elaborate survey to locate the principal losses in any mine. An engineer or inspector, provided with a map and a calibrated anemometer, should be able to locate the sources of major losses in a ventilating system. The initial examination should be made in the open split, traveling it from end to end. Judgment and knowledge of the mine will indicate the location and the number of readings desirable. It is essential that the open split be the focus of attention until that circuit is in the best possible condition.

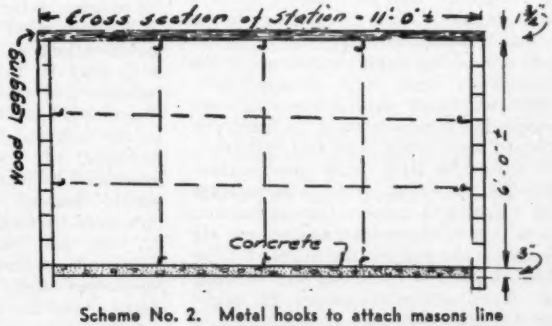
The ultimate effect of some obstructions in the air courses can only be determined by pressure readings. Air leakage, if scattered and at many points, can likewise only be evaluated by means of pressure-volume survey.

As suggestions in the conduct and use of ventilating surveys, the following is offered:

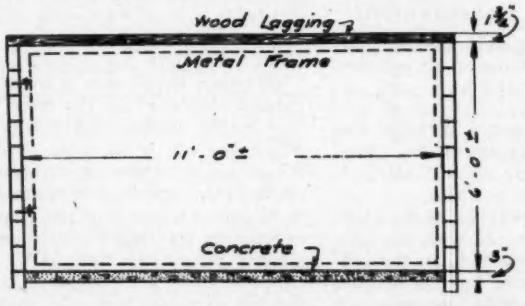
1. Make periodic inspection of all permanent stoppings, doors, and overcasts to determine any leakage or loss between the intake and return air courses.
2. When permanent stoppings and overcasts are necessary, see that they are built substantially and air tight as possible.
3. Have overcasts made with smooth surfaces and with sweeping curves at approach and discharge ends.
4. When air velocities exceed 800 ft. per minute, additional airway capacity is indicated.
5. Use every precaution to keep the airways of the open split large and unobstructed because this split controls the ventilation of the entire mine.
6. See that water is not permitted to stand in main air courses.
7. Keep ventilation map up to date.
8. Establish permament measuring stations for the main splits of air with the correct cross-sectional area posted thereon, and use the section-traverse method of taking anemometer readings at such points.

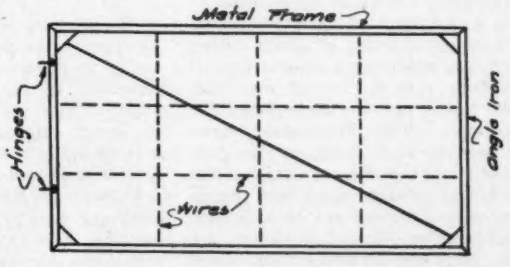
Plans for Permanent Air Measuring Stations





Scheme No. 2. Metal hooks to attach masons line

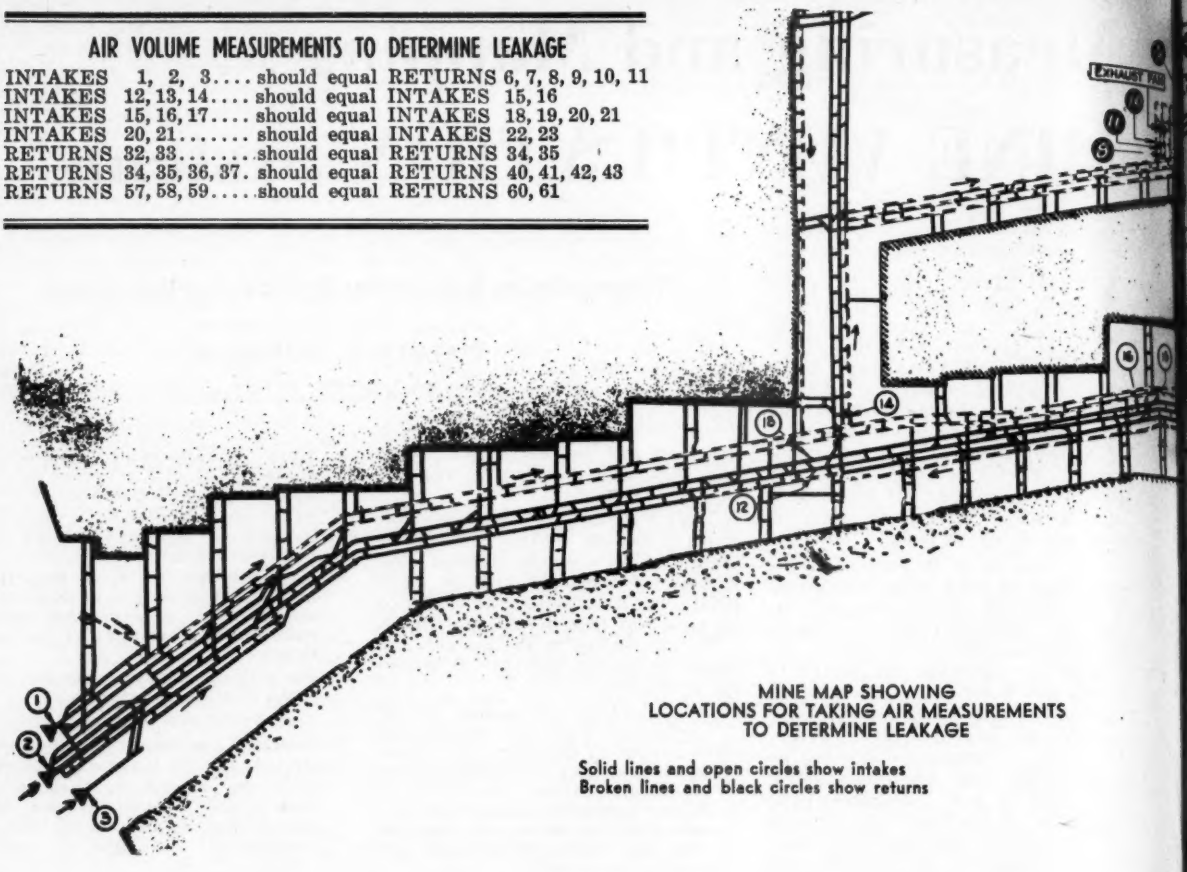




Scheme No. 1. Hinged metal frame with cross wires

AIR VOLUME MEASUREMENTS TO DETERMINE LEAKAGE

INTAKES	1, 2, 3....	should equal	RETURNS	6, 7, 8, 9, 10, 11
INTAKES	12, 13, 14....	should equal	INTAKES	15, 16
INTAKES	15, 16, 17....	should equal	INTAKES	18, 19, 20, 21
INTAKES	20, 21.....	should equal	INTAKES	22, 23
RETURNS	32, 33.....	should equal	RETURNS	34, 35
RETURNS	34, 35, 36, 37.	should equal	RETURNS	40, 41, 42, 43
RETURNS	57, 58, 59....	should equal	RETURNS	60, 61



MINE MAP SHOWING
LOCATIONS FOR TAKING AIR MEASUREMENTS
TO DETERMINE LEAKAGE

Solid lines and open circles show intakes
Broken lines and black circles show returns

Ventilation Maps

Assuming that ventilation surveys are desirable and often essential, a good ventilation map is a prime requisite. By "map" is not meant the regulation mine map, although general ventilation data is given on such maps, but a map made to indicate and record ventilation data and little else. It should be on a fairly good scale—say 200 ft. equals 1 in.—and indicate by colors and arrows the course and direction of the intake and return air currents throughout the mine. By the use of suitable symbols, the location of doors, overcasts, stoppings, regulators, etc., may be shown and the pertinent data obtained in ventilating surveys should likewise be recorded.

The map submitted with this report is not a reproduction of any existing mine but is intended to show a typical ventilating circuit having one fan, several inlets, and one main outlet for the returns. This illustration, however, because of its reduced size does not show all the details, and on the original, all doors, stoppings, regulators and overcasts are located and the coursing of the air is shown not only by lines and arrows, but in colors, one color for intake air, another color for return air. The free split can be indicated and emphasized by the use of another color or colors.

The encircled numbers show different locations at which quantity readings may be taken to check the air balance and the accompanying table illustrates how leakage may be found on the various splits and circuits. For example, the total quantity of air measured at locations 15, 16, and 17 should balance the total quantity measured at locations 18, 19, 20, and 21. In this "sample" mine, all air splits are controlled by constructed regulators and overcasts eliminate doors on all the main circuits.

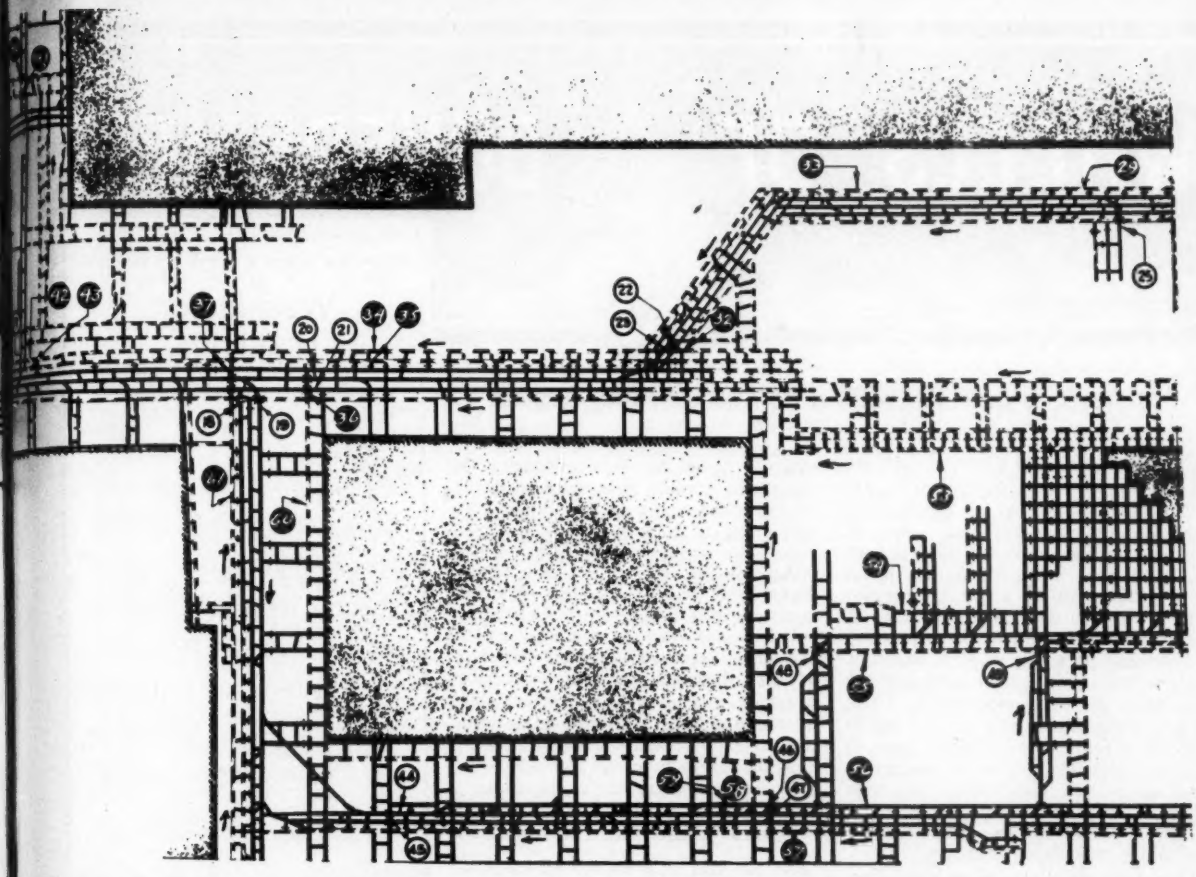
Air Volume Measurement

The correct methods for correctly measuring the volume of air are generally understood and have been emphasized in many discussions and papers. The committee believes that too much emphasis cannot be placed on this subject, because such methods are not followed in practice.

Velocity readings taken by mine officials are usually made with the anemometer held in the hand in the center of the air course for one minute. The area at the place measured is commonly the result of the roughest kind of measurement. Where velocities are relatively low, as in the active sections, center readings taken with the anemometer held at arm's length with accurately measured areas are reasonably correct. But to use such a procedure in high velocity air courses or for measuring total volumes in splits will result in absurdly high readings and nullify any attempt to reconcile the total of the readings in the sections with the total delivered to the mine.

There is reason to believe that the requirements for efficient and adequate ventilation will become more stringent, so that it is more and more desirable to know with some exactness the ventilating and be prepared to use them efficiently.

Of prime importance is to know the correct volume of air delivered by the fan in the various main splits into which the air is necessarily divided. As an aid to obtaining uniformly accurate readings, it is suggested that, in all mines whose production and life expectancy warrant the expense, permanent measuring stations be established in each main split as close to the fan as convenient. At each such



measuring station, a smooth cross-section should be prepared flush with top, bottom, and sides of the adjacent air course with the accurate cross-section in square feet determined, recorded, and preferably painted on the wall at each such station.

The two plans for the construction of a measuring station are offered only as a suggestion, since there are many other ways of accomplishing the same result. For example, there would be no need to lag the top if it were reasonably smooth. The use of cross wires or cords to divide the cross-section of the entry into approximately equal areas may be considered too much of a refinement, but experience has shown that too much care cannot be taken if an accurate average velocity in a high velocity split is to be had. Besides, it takes but little longer to make a correct reading and such readings are not taken every day. The division into approximately equal squares or rectangles should be some divisor of 60, as 10, 12, 15, etc.

A method for taking anemometer readings in an area properly prepared for measurement is as follows. Assume the area is divided by the cross-wires into 12 equal squares or rectangles. The observer should be provided with a stick long enough to reach both ribs without moving his body and while standing in the center of the air course slightly less than arm's length down stream from the measuring plane. With the anemometer secured to the end of the stick, the instrument should be held in the approximate center of each of the 12 rectangles for 5 or 10 seconds.

By reading in this manner with a calibrated anemometer and at stations prepared for such readings, the following errors are eliminated or reduced to a minimum:

1. Errors resulting from inaccurately measured cross-section.
2. Errors caused by readings in constricted or turbulent areas.
3. Errors resulting from one-position reading.
4. Errors caused by improper timing.
5. Errors resulting from taking readings in high velocity sections and from holding anemometer too close to body.
6. Errors due to inaccuracy of instrument or to neglecting the anemometer correction.

With measuring stations such as described and accurate readings taken therein, successive readings as required have the double assurance of uniformity and accuracy; marked deviations from previous readings will then indicate that changes in one or more of the main air circuits have occurred and thereby call attention to a circumstance that may call for investigation.

The foregoing is intended for the accurate measuring of main split air volumes. In ventilation surveys, traversing the area with the anemometer held at arm's length to reduce turbulence, combined with accurately measured cross-sections, will give results of sufficient accuracy.

ESTIMATED COST OF CONSTRUCTING MEASURING STATION

	6' length	10' length
Trimming sides, roof and grading floor	20.00	30.00
4-in. concrete block walls	32.00	45.00
Concrete floor	30.00	43.00
Wood lagging—treated	20.00	32.00
Metal frame with cross wires	30.00	30.00
Total	132.00	180.00

WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

RAPID DISSOLUTION of the armies of Germany has prompted the statement by War Mobilization and Reconversion Director James F. Byrnes (since succeeded by Fred M. Vinson) that cutbacks in munitions production will be about 20 percent in the first 90 days following the defeat, increasing thereafter to perhaps 40 percent at the end of 12 months. In production circles these figures are regarded as too conservative. The War Production Board is expected to submit a redrawn conversion plan to Vinson, probably calling for the winding up of the Controlled Materials Plan, the easing or dropping of many L and M orders and the use of a much simplified priorities program.

After speeding necessary legislation including departmental supply bills, the House is taking its Easter recess. Under administration pressure the Senate has stayed on to wrestle with the conferees' report on the difficult manpower bill, but the resignation of OWMR Director Byrnes coupled with his statement that the end of the European war is very near, and that the manpower measure was really desired by the administration to maintain control in the reconversion period, has probably killed the bill.

Trade Agreements

Introduction of a bill by Chairman Doughton, of the House Committee on Ways and Means, to extend the President's authority to negotiate Reciprocal Foreign Trade Agreements for three years has started a congressional battle which is expected to run for several months. Hearings are to begin on April 16 before Doughton's committee. As introduced the measure would permit an additional reduction in duties existing on January 1, 1945, of 50 percent. This could and in many cases probably would mean a reduction of as much as 75 percent as to commodities which have previously received a cut of 50 percent in the rates set by the Tariff Act of 1930.

House opposition to the bill will endeavor to strike this authority to negotiate further reductions in duty; to limit extension of the President's authority to negotiate trade agreements to one year; and to require congressional approval of each agreement prior to its becoming effective. Senators and Congressmen from agricultural, stock raising and mining constituencies are voicing sharp criticism of the Administration's tariff cutting program, and representative labor groups are insisting that in the making of trade treaties proper duties be provided to make up for the difference in domestic and foreign wage scales.

Coal Wage Controversy

At the end of a month of negotiations between the coal miner-operator wage scale committees based on John L. Lewis' 18 demands (as reported last month), the mines are now working under a 30 day extension of the old agreement at the order of the National War Labor Board. The strike vote conducted by the National Labor Relations Board under the provisions of the Labor Disputes Act tallied 208,718 to 25,156 in favor of striking.

The Secretary of Labor entered into the negotiations on March 27, proposing a seven-hour workday at $1 per hour, with the remaining two hours, including travel time and a 15-minute lunch period, to be compensated at time and one-half—resulting in a day wage of $10 instead of the $8.50 now paid. The Secretary gave no recognition to the Lewis demand for a "participating royalty" of 10 cents per ton.

The anthracite wage scale committee for the UMWA is reported to be drafting demands to be presented to operators of the Region in New York in preparation for negotiations for a contract to succeed that expiring April 30. Again the miners' representatives have requested that a strike vote be conducted by the NLRB.

The Jewell Ridge Coal Corporation's travel time pay case was argued before the U. S. Supreme Court on March 9. It will be remembered that this important legal controversy originated in a Virginia Federal District Court which held on January 5, 1944, that travel time in coal mines is not work-time under the Fair Labor Standards Act.

Supervisory Employes

Following its further hearings on February 27 on the question of bargaining rights and union recognition for supervisory employes, the National Labor Relations Board in a March 26 decision in the Packard Motor Car Company case granted collective bargaining rights to the Foremen's Association of America. This action is a reversal of the Board's position in the Maryland Drydock case wherein an organization of foremen was held not to be an "appropriate unit" for collective bargaining under the National Labor Relations Act. Board Chairman Millis and member Houston referred in the decision to the changing status of the various grades of foremen in mass production industry, commenting that in the place

Washington Highlights

HOUSE: Takes Easter recess.

SENATE: Frowns on manpower bill.

BYRNES: Succeeded by new RFC chief Fred Vinson.

TRADE AGREEMENTS: Doughton announces hearings April 16.

COAL MINES: To extend operation for 30 days.

FOREMEN: NLRB reverses Maryland Drydock decision.

SELECTIVE SERVICE: Eases draft on young miners.

BRETTON WOODS: Bank meets approval; fund criticized.

GOLD RESERVE: Senate committee reports Wagner-Spence Bill.

OPA: Reprimanded for its treatment of depletion.

METAL PREMIUMS: Senate approves payments.

STOCKPILING: Bills introduced by Military Affairs Committees' chairmen.

these men now occupy they are "more managed than managing."

In a well expressed dissent member Gerard D. Reilly asserted that the new ruling does irreparable damage to the delicate balance between the conflicting interest of management and workers which the National Labor Relations Act sought to bring about in American industry and that from the very beginning the Board has recognized that the interests of foremen lay predominantly with management groups.

Manpower

The storm-tossed manpower bill, as reported by the House-Senate conferees and approved by the House immediately before its Easter vacation, is having a rough time in the Senate. As the measure now stands the War Mobilization Director is given authority to fix employment ceilings, establish hiring regulations, and freeze workmen in areas, activities, plants, facilities and farms as he may find necessary to the war effort. Wilful violation calls for imprisonment of not to exceed 12 months or fines not to exceed $10,000, or both. Any wages paid in violation of manpower regulations would be denied as operating expenses for tax purposes and also could be withheld by the Government from any contract payment to employers. The turn of events on the European battle fronts is having a decided influence in strengthening opposition to this bill.

As the result of earnest representations made by WPB, Solid Fuels Administration, and other agencies, the Selective Service System has materially eased military draft practices in the 18-29 age group as to mining and other basic industries. State directors, according to press reports, have been informed that certifying agencies may increase quotas to a reported 60,000 for steel and foundry plants, including iron ore mines; 10,000 for nonferrous metal mines and smelters; and 30,000 for coal mines.

Bretton Woods Bill

A coolness toward Treasury Secretary Morgenthau's appeal for the enactment of the Bretton Woods Fund and Bank proposal in advance of the United Nations Conference in San Francisco April 25, has been increasingly evident on Capitol Hill. Hearings before the House Committee on Banking and Currency, now suspended until after the Easter recess, have indicated a strong groundswell of conservative opinion favoring the creation of the International Bank but at least reserving judgment on the desirability of setting up the proposed International Monetary Stabilization Fund.

In the course of the testimony of Harry D. White, the assistant secretary of the Treasury who has been intimately identified with the Bretton Woods proposal, the committee inquired concerning letters addressed to the *New York Times* by Robert Boothby, an outstanding British critic of the plan and a member of the British Parliament. Boothby has called attention to "major obscurities" in the fund proposals, stating that "you have been led to believe that the Bretton Woods proposals take us all back along the road to a gold standard, currency stability, nondiscrimination and multi-lateral trade. We have been assured that they constitute the exact reverse of a gold standard, that exchange rates will be flexible and that reciprocal trade agreements involving discrimination will be permissible." White answered by saying that Boothby was not a delegate to the Bretton Woods conference and that there are no differences in opinion between the British and the American representatives on the points which Boothby cited.

W. Randolph Burgess, president, American Bankers Association, approved the bank but held that the fund should not be created and that the stabilization of currency should be handled under the bank. Ralph E. Flanders, president, Federal Reserve Bank of Boston and head of a Research Committee for the Committee for Economic Development, recommended that the Bretton Woods plan be amended to give the bank specific authority to make loans for the stabilization of exchange as well as for reconstruction and development, and that the establishment of the fund be postponed. The Finance Committee of the U. S. Chamber of Commerce has endorsed the bank but recommends that action on the fund be deferred until after the bank is in operation and its Board of Governors has had opportunity to make recommendations respecting the stabilization of exchanges.

It is now being pointed out that none of the other participating nations have as yet ratified the Bretton Woods proposal and that therefore any revision which the United States Government finds it wise to make, could without difficulty be submitted to these signatory countries.

Cut Gold Reserves

Late in March the Senate Committee on Banking and Currency reported, with two amendments, the Wagner bill, S. 510, to reduce the gold reserve requirements behind Federal Reserve notes and deposits to 25 percent. The amendments repeal the authority to issue Federal Reserve banknotes, requiring no gold backing, and the authority to issue $3 billion in "greenbacks" granted by the "Thomas amendment" to the Agricultural Adjustment Act of 1933.

Senator Abe Murdock of Utah, a member of the committee, vigorously contended that the quantity of gold in the world today is not sufficient to supply our currency and credit system and urged that the objective of the bill be accomplished by increasing the price of gold to $56 per ounce. Through Representative Clair Engle of California, who has also introduced a bill authorizing a $56 gold price, a number of western congressmen proposed to the House Committee considering the companion bill, that any reduction in the gold backing of Federal Reserve currency should be held to 30 percent, and should be on a temporary basis, for a fixed period of two years, with the present reserve requirements to be automatically reinstated thereafter unless Congress should take further action. This position was strongly supported by the American Mining Congress in a statement to both Senate and House Committees, urging adherence to sound and tested monetary principles as embodied in the minimum gold reserve requirements that have been established for many years.

OPA and Depletion

Widespread protests have been made against the action of OPA in excluding percentage depletion on the monthly report forms for bituminous coal mines, and against similar procedures by that agency in computing production costs of iron ore and other minerals. At the Banking and Currency Committee hearing the rather lame attempt on the part of an OPA witness to justify such action met with severe criticism from Senators Taft of Ohio, Millikin of Colorado, Murdock of Utah, and McFarland of Arizona.

The committee has reached tentative agreement to report the Price Control and Wage Stabilization Act extension without change for one year, after receiving assurances from OPA officials that their administrative procedure will be adjusted in line with protests made by business groups. It is anticipated that the desires of the committee will be expressed in its report which will accompany the bill as presented to the Senate.

A strong statement presented to the committee by the American Mining Congress protested OPA's refusal to recognize percentage depletion as a cost item in determining allowable price ceilings for metal products. The fact was stressed that the law prescribes that the depletion allowance for coal, metal and certain other mines *shall be computed* on the percentage basis, except that it shall not be less than if computed on the "sustained" basis, and that accordingly for mines taking the percentage allowance, percentage depletion is

(*Continued on page* 72)

Personals

Raymond E. Salvati, vice president in charge of operations of the Island Creek Coal Company, Pond Creek Pocahontas Company and Marianna Smokeless Coal Company, has been appointed to the Board of Governors

of West Virginia University and has been named as chairman of the board. He was graduated from the university as a mining engineer with the class of 1922.

Arnold A. Gustafson, who has been a mining engineer with the Freeport Sulphur Company in various capacities, more recently in the company's New York office, has moved to Toronto, where he is resident manager of the Freeport Exploration Company.

Chester A. Fulton has resigned as president of the Southern Phosphate Corporation, of which organization he has been key executive for the past 17 years. He plans to go into private practice as a mining engineer.

William S. Palmer is now at Jewell Ridge, Va., acting as director of safety for the Jewell Coal Corporation. He was formerly mine superintendent of the Milburn By-Products Coal Company.

Donald J. Reese, with the Steel Division of the War Production Board at Washington, D. C., since April, 1942, has returned to the Development and Research Division of The International Nickel Company, Inc., at New York, **T. H. Wickenden,** manager of that Division of the company, has announced.

Carlton D. Hulin, professor of mining geology at the University of California, is now on a special mission in India and China as a mining geologist for the Foreign Economic Administration.

George G. Shallenberger, St. Paul, Minn., has resigned as secretary of trustees and as director, secretary-treasurer, and manager of the Great Northern Iron Ore Properties. However, he will continue to serve as president of the Lake Mining Company, operating the Embarrass mine on the Mesabi Range.

David R. Mitchell, head of the department of mineral engineering, Pennsylvania State College, was recently elected to honorary membership in the International Mark Twain Society for his contributions to the literature of mining and mineral preparation.

Philip J. Boyer, who has been mill superintendent of the Ringwood plant of the Alan Wood Steel Co., has become general plant superintendent of the Scotia Mining Co., State College, Pa. It is reported that the iron ore mine and mill are scheduled for operation immediately.

B. M. Rogers, formerly associated with the Stonega Coke and Coal Co., has been appointed to the general supervisory staff of the mining department of the DeBardeleben Coal Corporation, with headquarters at Sipsey, Alabama.

Ernest F. Rumpf, vice president of the Pittsburgh Coal Company since 1939, has resigned, effective March 1, to become associated with Georgeson & Company, financial consultants of 52 Wall Street, New York.

A native of Minnesota, Mr. Rumpf came to Pittsburgh Coal from Kenwood Mills, Albany, N. Y., of which he was secretary and controller. Previously he was associated with J. L. McKinsey Company, industrial engineers, and practiced public accounting. He is a graduate of the University of Minnesota.

P. W. Bigley, who has been preparation manager for the Central State Collieries, Inc., and the Little Sister Coal Corporation, has joined the engineering staff of Centrifugal and Mechanical Industries, Inc., St. Louis, Mo.

William F. McCandlish, Hercules Powder Company explosives salesman, who was captured by the Japs in Manila in 1942 and interned in a prisoners' camp, was among those Americans freed when U. S. troops captured the Los Banos prison camp.

Walter B. Jones, who has been a lieutenant colonel in the U. S. Army, has returned to civilian life and resumed his former duties as state geologist of Alabama.

Walter O. McClintock, who has been assistant superintendent of electrolysis for Basic Magnesium, Inc., has gone to Mulberry, Fla., as metallurgist in the research department of the International Minerals and Chemical Corporation.

Carl J. Calvin, for many years chief engineer of the Great Northern Iron Ore Properties, with offices in Hibbing, Minn., was recently promoted to the position of vice president of the Arthur Iron Mining Co., subsidiary of the Great Northern.

A. G. Bussmann has been elected vice president in charge of sales, Wickwire Spencer Steel Company, according to announcement by **E. P. Holder,** president.

William L. Burt, formerly vice president of The Jefferson Company of Wheeling, W. Va., has accepted appointment by the British government as consultant on coal stripping in Great Britain.

Frederic H. Wright, who until recently has been supervising engineer of the Secondary Metals Section, U. S. Bureau of Mines, has joined the staff of Lucius Pitkin, Inc., metallurgical chemists and engineers. He is assistant to the president.

J. H. Patterson has been appointed manager of the Cummins Diesel Export Corporation, subsidiary of the Cummins Engine Company, Inc., Columbus, Ind. Officers of the Export Corporation are located at 6303 Chrysler Building, New York 17, N. Y.

Olaf N. Rove, who was formerly a mining geologist with the ferro-alloys division of the War Production Board, has been engaged by Pickands, Mather & Company of Cleveland, Ohio, to make special studies of iron ore deposits.

Lt. Col. C. R. Mabley, Jr., formerly assistant to the vice president in charge of sales, Island Creek Coal Sales Co., returned recently from a tour of duty in the European theater of operations. Col. Mabley has been in charge of the Army's solid fuel supply program in the United States and all theaters of war. A discussion of the activities of this branch of the Quartermaster General's department was published in the October, 1944, issue of MINING CONGRESS JOURNAL.

Albert W. Goodwin of the Santa Fe, New Mexico, office of the U. S. Geological Survey, has become associate engineer of the Survey's office at Asheville, N. C. He succeeds **Raymond Leonard**, who resigned last September.

F. E. Wormser, secretary and treasurer of the Lead Industries Association, has been elected as acting secretary and treasurer of the Metal Powder Association. The offices of this association are now at 420 Lexington Avenue, New York City.

Luis Jordan, who has been on the engineering staff of Island Creek Coal Co., resigned recently to join the engineering staff of the Rail and River Coal Company at Bellaire, Ohio.

Clyde R. Terrell has taken over the editorship of the *Tonopah Times-Bonanza*. He is widely known as a writer of desert stories.

Directors of the Goldfield Deep Mines Company at a meeting held February 21 elected **Martin Duffy** president and general manager to fill the vacancy caused by the death of **Ed Lembcke**.

R. P. Tyler has been appointed general sales manager for Macwhyte Company, Kenosha, Wis. He was formerly sales manager for A. Leschen & Sons Rope Company, of St. Louis.

Gilbert H. Gaus has recently been appointed manager of the Gardner-Denver Company's New York branch office at 76 Ninth Ave. He succeeds **G. V. Leece**, vice president, who has been placed in charge of the company's Export Division.

H. A. Wheeler, well-known in mining circles in the St. Louis, Mo., area, has given up his consulting mining engineering office. He reports that he has retired to give the younger men a chance; he is now 86 years old.

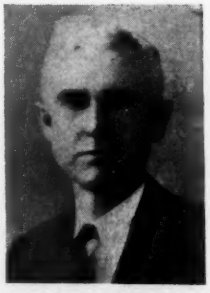
Dr. Daniel C. Braun has been appointed medical director of the Pittsburgh Coal Company's new department of industrial medicine. The division was created to provide better supervision of the health of company employes and for research into medical problems peculiar to coal mining.

R. L. Heath, formerly chief metallurgist for the Allison Division of General Motors at Indianapolis, Ind., has joined the Climax Molybdenum Company as metallurgical engineer, with headquarters in St. Louis, Mo.

Philip L. Ray, of St. Paul, Minn., was recently elected president of the trustees of Great Northern Iron Ore Properties. He succeeds **Louis W. Hill**, who has resigned.

H. S. Earnest has been promoted to superintendent of mines 11 and 17 of the DeBardeleben Coal Corporation. He was formerly general mine foreman of the Coal Valley division.

William F. Boericke, chief engineer of the Philippine Bureau of Mines, who was a prisoner of the Japanese in Santo Tomas concentration camp, was among those freed recently by the United States and Filipino troops. He is said to be recovering from beriberi and has lost 50 pounds since his



internment. During his stay in Santo Tomas he taught a course in mining to senior students and organized a camp garden, all of which contributed materially to the well-being of his fellow prisoners. Mr. Boericke was formerly senior valuation engineer with the Securities and Exchange Commission in Washington.

The appointments of **Ernest P. Schroeder** as manager of the Foreign Engineering Department of the Westinghouse Electric and Manufacturing Company and **John T. Mathews** as assistant manager have been announced by **John W. White**, president and general manager of the Westinghouse Electric International Company, and **C. A. Powel**, manager of Headquarters Engineering of the Westinghouse Company.

Obituaries

Howard Melville Hanna, 68, chairman of the board of the M. A. Hanna Co., died March 17 following a heart attack. Mr. Hanna was a leading northern Ohio industrialist and a nephew of the late Senator M. A. Hanna.

C. W. Jones, Sr., 70, president of the Merrill Coal Co., died January 6 in Logan, W. Va. Mr. Jones founded the Merrill Coal Company in 1941 and has been active in the coal industry for 40 years, having been president of the Logan Coal Operators Association for several years.

Frank P. Williamson, who has been chief draftsman of the Lehigh Valley Coal Company for 27 years, died January 3 at his home in Wilkes-Barre, Pa.

William H. Broadgate, 72, formerly joint operator of the Arizona Mining and Machinery Co., Prescott, Ariz., died at Prescott January 2. Mr. Broadgate retired from active duty because of ill health in 1942. At that time he was associated and in business with his son, William C. Broadgate, who is now Assistant Director of the Arizona Department of Mineral Resources, Washington, D. C. Mr. Broadgate was a native of Grimsby, England.

John E. (Uncle Jimmy) Lindley, 100, Arizona pioneer and mining engineer, died at Tucson December 24, 1944. He was a native of Lancaster, Pa.

James Lincoln Ashley, 75, a director of the International Nickel Company of Canada, Limited, died March 6 in New York.

Mr. Ashley was formerly secretary and treasurer of the International Nickel Company of Canada, Limited, and vice president and treasurer of the International Nickel Company, Inc., the United States subsidiary, and was at the time of his retirement in December, 1939, the one person in the organization who had attended in one official capacity or another, every annual meeting of the present and predecessor companies since the original International Nickel Company was formed in 1902.

Born in New York on October 14, 1869, he spent his youth in that city. After preparing for Yale, he joined the staff of Joseph Wild & Company, of New York, where he remained until 1902.

AT HOME . . .

in Remote Locations!

Where locations are remote . . . attendance intermittent . . . continuous water supply unavailable, Gardner-Denver "WB" Water-Cooled Vertical Compressors are right at home!

Designed to meet the severe operating conditions of mining service, these two-stage compressors deliver a large air volume . . . operate at efficiencies comparable to those of large, two-stage horizontal compressors. Exceptionally compact, they are readily moved from location to location.

Their completely water-cooled cylinders and combination radiator and air-cooled intercooler assure a cool-running compressor regardless of altitude or temperature . . . eliminate the need for outside water piping.

OTHER "WB" EXTRAS:

- **Ruggedly built with castings of GarDurloy for extra strength and hardness.**
- **Drop-forged crankshaft mounted on Timken main bearings.**
- **Force feed pressure assures adequate lubrication of all working parts.**
- **"Cushioned" Duo-plate valves are silent . . . assure maximum efficiency and lowest power consumption.**
- **Available with direct motor drive or V-belt semi-portable unit, with gasoline or Diesel power for easy transportation.**

For complete information and specifications on "WB" Compressors, write for illustrated bulletins. Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER *Since 1859*

THEY EVEN SURVIVE WRECKS

Edison Alkaline Batteries in mine locomotives and shuttle cars have survived so many wrecks with little or no damage — and then have gone on to deliver full service life — that maintenance men no longer are apt to get excited when they see damaged trays of cells come into the shop.

They usually just test, reassemble, and send out again. They *expect* them to stand up simply because they have seen them do it so often, and have learned that the steel cell construction of alkaline batteries has no equal for rugged strength.

Yet their durable mechanical construction is only one of a number of reasons why alkaline batteries are dependable, economical power units. They can be fully charged in 6 to 7 hours direct from the d-c. power supply; do not require critical rate regulation; give longer life than any other type of battery; can be laid up indefinitely without injury; can be ventilated rapidly for high-temperature operation, yet are not damaged by freezing.

Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, New Jersey.

LOCOMOTIVE FALLS 170 FEET; BATTERY STILL TESTS O. K.

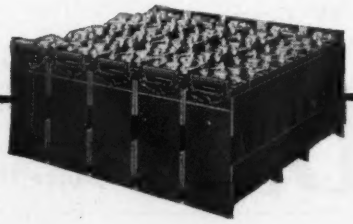
A worker was unloading steel near the top of a mine shaft. A trammer was in the way. He did not know how to move it but he saw the controller handle and shoved it on.

The trammer headed for the shaft, smashed through the gate, fell down the shaft, and stopped just above the 200 level, a drop of 170 feet.

The alkaline battery in the trammer required a few external repairs but all the cells tested O. K. so it was returned to service. It was then five years old. It later delivered an additional eight years of service.

The fact that alkaline batteries can withstand such accidents, illustrates the extra dependability that they deliver under more normal conditions.

TYPICAL 40-CELL BATTERY FOR SMALL TRAMMER



Edison

ALKALINE BATTERIES

NEWS and VIEWS

Ray Goad, 25, has returned to the bituminous coal fields after 15 months in the Pacific at Guadalcanal and New Guinea with the U. S. Army. Discharged, "because my nerves went bad," Ray says, "I would rather dig my fox holes in coal any day in the week"

Hamilton Wright Photo

Eastern States

Use Blood Plasma in Euclid Mine Accident

The Pittsburgh Coal Company has been commended to State Secretary of Mines Richard Maize for using blood plasma at the scene of an accident to save the life of a seriously injured worker at Euclid Mine, Smithton, Pennsylvania, February 22.

The company, through its medical department, recently installed blood plasma units for emergency use at each of its 17 mines.

State Mine Inspector James R. Walthour, reporting the case to Secretary Maize, expressed belief that it was the first instance of blood plasma use at a coal mine.

The victim of the accident, James Bush, 28, of Fitz Henry, Pa., now is recovering in Mercy Hospital. He was working at the bottom of a 189-ft. coal hoisting shaft when he was struck on the head and shoulders by falling ice. His head was badly lacerated and a shoulder blade broken.

Dr. McClain Post of Smithton, who arrived on the scene ten minutes later, found the miner unconscious and suffering from severe shock. Usual treatment for shock had no effect. Dr. Post then began administering the plasma from the mine kit. It was the first time in his 15 years of medical practice that Dr. Post had ever used plasma. The treatment took an hour and a quarter. By that time the miner had responded sufficiently to permit his safe removal to the hospital.

Mine Officials Join Safety Club

Twenty-five supervisory officials of the Pittsburgh Coal Company became members of the company's Safety Championship Club at the annual dinner meeting of the organization in the Fort Pitt Hotel recently.

Membership in this group is restricted to supervisors whose men have not been seriously injured in a three-year period. J. B. Morrow, president of the company, presented wrist watches to the new members. R. H. Nicholas, safety director, presided.

John D. Clark, of Sutersville, and Gilbert Blackledge, of Library, members of the safety director's staff, became honorary members of the club because of their work in rescuing two men trapped by fire in Banning One Mine last October.

Others who received awards included:

Banning One Mine, Van Meter—George Bibby, Joseph Migrock, Nicholas Manach, Frank Marianna. Banning Two, West Newton — Coulter O'Neil. Crescent, Daisytown—D. H. Watkins, John Hodson, B. H. Waugh. Linley, Canonsburg—William Borza, John Carroll, Joseph Lenik, Emil Servant. Midland, Houston—Adrian Tiessier. Montour Four, Lawrence—Chester Hitchew. Montour Nine, McDonald—Joseph Openbrier. Montour 10, Library—Willis Barker, Edward Gary, William Styche. Ocean, Smithdale—Michael Sapko. Westland Mine, Westland—Joseph Kress, William McCoy. Preparation plant, Imperial—C. P. Proctor. Library shops—James Leighty.

Coal Company Merger

Officials of the Pittsburgh Coal Company and Consolidated Coal Company said recently that their tentative plan for merging the two concerns had been submitted to government agencies for consideration.

If approved, the boards of the two companies will arrange to submit the proposal to stockholders around June 1. In the new corporation, the $125,000,000 Pittsburgh Company will have a 65 percent interest, with the balance going to the $32,000,000 Consolidation Company.

The two are among the largest producers of bituminous coal. According to the reported plans of A. K. Oliver, Pittsburgh chairman, and George H. Love, Consolidated president, the new corporation will issue between 13 and 16 million in debentures. Common stock will complete the recapitalization.

It is said that before the merger

Consolidated will retire its preferred stock, paying $52.50 a share for it. The small funded debt of Pittsburgh and its subsidiaries will be continued.

Camp Lightfoot Improvements

Major additions will be made to facilities of Koppers Recreation Camps, Inc., for the children of miners employed by Koppers Coal Division, Eastern Gas and Fuel Associates, when wartime restrictions permit, Thomas E. Lightfoot, director of welfare for Koppers Coal has announced with the release of his 1944 camp report.

Additions to Camp Thomas E. Lightfoot, for white children, near Hinton, will include a large recreation hall. An entirely new camp will be built at a new location for colored children who now attend Camp Wyndal near Gauley Bridge.

Mr. Lightfoot reported to officers and directors of the non-profit corporation that 767 children from 8 to 14 years enjoyed two weeks of camp during seven camping periods at the two camps last year. There were 443 youngsters who qualified for American Red Cross swimming certificates, incuding 38 who qualified as junior life savers and eight who earned senior life saver awards. Virginia Lee West, Lewisburg, W. Va., was American Red Cross water safety instructor at Camp Lightfoot.

Virgil M. Beckett, principal of Hillsboro schools, is director of Camp Lightfoot and supervisor of Camp Wyndal where M. E. English, principal of Morton Reaves School, Beckley, is director.

Paradise for children! Camp Lightfoot provides summer vacations for boys and girls 8 to 14, 90 percent of whom are bituminous coal miners' children. 200 children at a time get two weeks at $7 a week which includes round trip transportation

10-year-old Johnny Grassile is weighed in by camp counselor. He weighs 87½ pounds with dad's mine helmet on

Hamilton Wright Photos

New Mineral Laboratories

Contract for construction of the first unit of a large minerals laboratory at State College Experiment Station at Raleigh, N. C., may be let soon according to R. S. Dean, assistant director of the U. S. Bureau of Mines. Henry Lowell Hopkins is the architect. At the same time, State Geologist J. L. Stuckey said plans are progressing for building a $65,000 western North Carolina minerals laboratory at Asheville, to be operated cooperatively by State College and TVA.

As fast as conditions permit, the State College laboratory will be expanded. A small staff already is at work, using space temporarily provided by the college. Establishment of the laboratory in Raleigh is a step in the Bureau of Mines' program for "effective utilization of mineral resources." Faced with the fact that many minerals in this and adjoining states cannot be economically used under "present standardized and centralized" practices, the Bureau seeks to find new ways of processing minerals, new products in which they can be used, or other combinations of favorable circumstances.

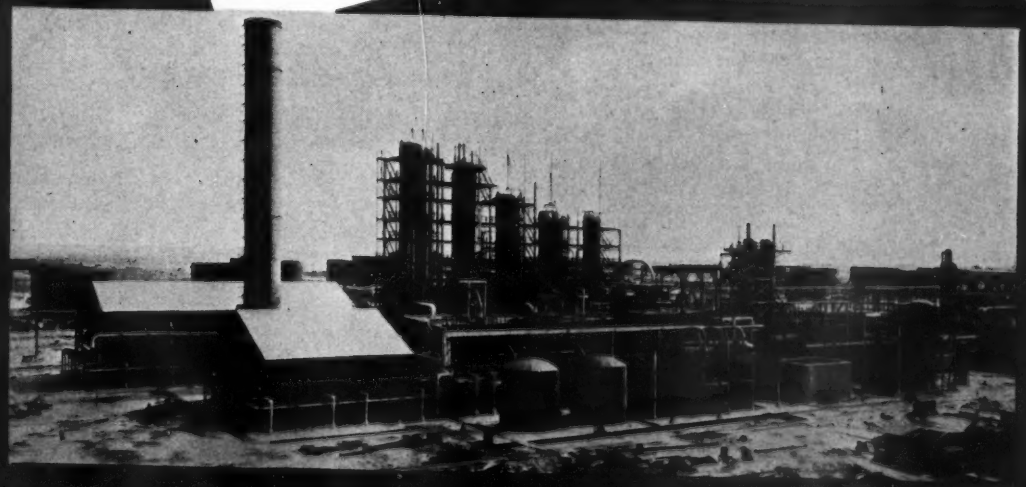
Experiments are going forward with sponge-iron from ore of the old Cranberry district. The Eisenhour Brick Company, of Salisbury, under contract with the Bureau of Mines, already has produced around 50 tons of iron which has been tested and found acceptable as a premium metal by tool manufacturers, but ways must be found to reduce present production costs. The Bureau of Mines recently completed a new building at Salisbury to house experiments there, and the sponge-iron is being rolled into "glomerules."

The State College Bureau of Mines laboratory currently is also experimenting with low-grade manganese ore and tungsten, both of which are reported to be abundant in the state.

The Chemical Industry uses enormous quantities of Coal

The by-products of about 100,000,000 tons of coal are used annually by this industry.

JEFFREY with its broad line of mechanical mining and preparation equipment — for operations above or below ground — is doing a major job of producing coal for this vital industry.



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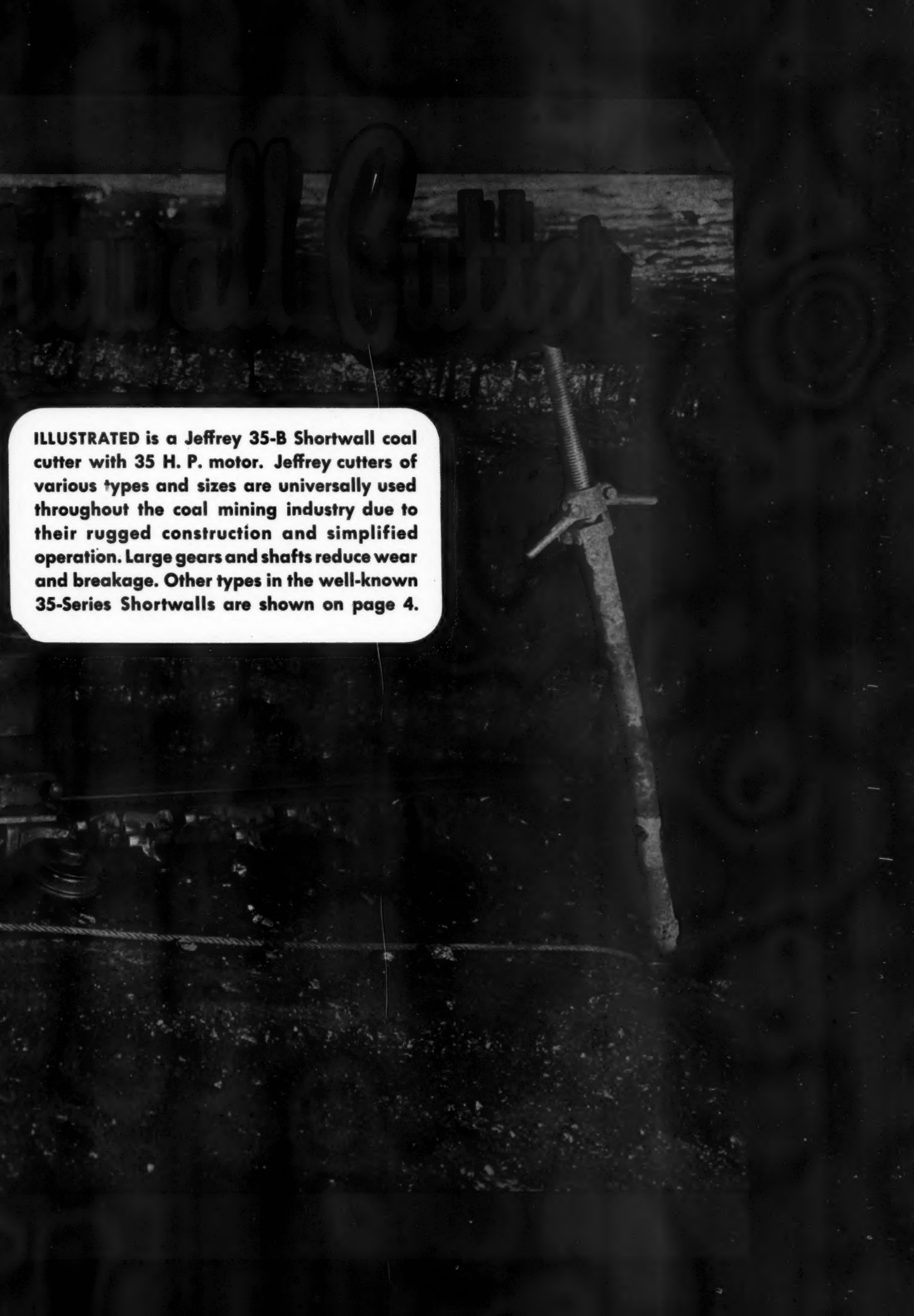


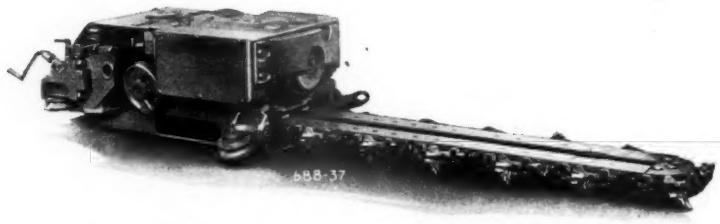
ILLUSTRATED is a Jeffrey 35-B Shortwall coal cutter with 35 H. P. motor. Jeffrey cutters of various types and sizes are universally used throughout the coal mining industry due to their rugged construction and simplified operation. Large gears and shafts reduce wear and breakage. Other types in the well-known 35-Series Shortwalls are shown on page 4.

Jeffrey SHORTWALL CUTTERS

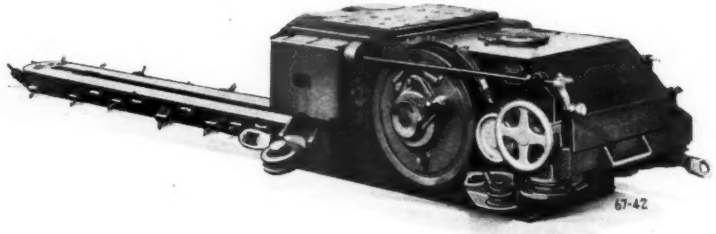
JEFFREY SERVICE TO THE COAL MINES MEANS SERVICE TO ALL INDUSTRY

JEFFREY EQUIPMENT FOR COAL MINES

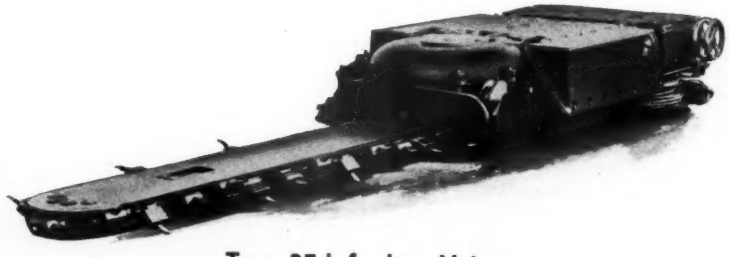
- BLOWERS
- CONVEYORS
- CRUSHERS
- CUTTERS
- DRILLS
- FANS
- JIGS
- LOADERS
- LOCOMOTIVES
- SCREENS



Types 35-20, 35-BC and 35-BCS for Conveyor Mining



Type 35-BB for Continuous Cutting



Type 35-L for Low Veins

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

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Sales Offices: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

Service Stations: Pittsburgh, Harlan, Ky., Birmingham, St. Louis, Logan-Beckley, W. Va., Scranton

Foreign Plants: Jeffrey Mfg. Co., Ltd., Montreal, Quebec; British Jeffrey-Diamond, Ltd., Wakefield, England; Jeffrey-Galion (Pty.), Ltd., Johannesburg, S. A.

Koppers Reports 1944 Construction

CONSTRUCTION of ten batteries of by-product coke ovens, totaling 622 ovens, with an annual coal carbonizing capacity of 4,809,000 tons, was completed by Koppers Company, Inc., Engineering and Construction Division in 1944.

During the year the company also started construction of six additional batteries, totaling 457 ovens, with an annual coal carbonizing capacity of 4,027,000 tons.

Firms for whom ovens were completed in 1944, the number of batteries, total ovens and coal carbonizing capacity are: Colorado Fuel and Iron Corporation, Pueblo, Colo., one battery, 74 ovens, 500,000 tons; Bethlehem Steel Company, Lackawanna, N. Y., two batteries, 114 ovens, 907,000 tons; Koppers Company, Inc., Seaboard Division, Kearny, N. J., one battery, 65 ovens, 492,000 tons; Sheffield Steel Company, Houston, Tex., one battery, 47 ovens, 383,000 tons; Lone Star Steel Company, Daingerfield, Tex., one battery, 78 ovens, 633,000 tons; Geneva Steel Company, Geneva, Utah, three batteries, 189 ovens, 1,324,000 tons; Brazilian National Steel Company, Volta Redonda, Rio de Janeiro, Brazil, one battery, 55 ovens, 570,000 tons.

All are Koppers-Becker Underjet type ovens with the exception of 114 Koppers-Becker ovens completed for Bethlehem Steel, and 140 Koppers ovens started for Carnegie-Illinois at Gary.

Koppers-built ovens now total 11,339 in the United States with a total annual coal carbonizing capacity of 80,877,000 tons, and 397 ovens in Canada with carbonizing capacity of 2,965,000 tons.

Reorganization of Bureau of Mines

THE further reorganization of the Bureau of Mines as covered by the administrative order of February 17 has to do with dividing the Division of Mining and Metallurgy into a Mining Branch and a Metallurgical Branch, and establishing field divisions in each of these branches in 10 headquarters' field offices. This change is being made to effect proper control by establishing a straight line organization replacing the previous set-up by commodities. No announcement is made as to the future of the "commodity" organization but it is likely that a nucleus staff of commodity specialists will be maintained in Washington as advisors.

The Mining Branch in Washington will be headed by L. B. Moon, with George D. Jermain as assistant. The Metallurgical Branch will be headed by R. G. Knickerbocker with O. C. Ralston as assistant.

The present field organization is as follows:

Alaska — No headquarters established, no personnel named.

Albany—Albany, Oreg. (Washington, Oregon, Idaho, Montana): Metallurgical Branch, Bruce Rogers; Mining Branch, S. H. Lorain.

Boulder City—Boulder City, Nev. (Nevada and California): Metallurgical Branch, C. W. Davis; Mining Branch, A. C. Johnson.

Salt Lake City—Salt Lake City, Utah (Utah, Wyoming, Colorado): Metallurgical Branch, S. R. Zimmerley; Mining Branch, Paul Awlsman.

Tucson — Tucson, Ariz. (Arizona, New Mexico, Texas): Metallurgical Branch, Paul M. Ambrose; Mining Branch, J. H. Hedges.

Minneapolis—Minneapolis, Minn. (North Dakota, South Dakota, Nebraska, Minnesota, Iowa, Wisconsin, Michigan): Metallurgical Branch, E. P. Barrett; Mining Branch, Edw. Fitzhugh, Jr.

Rolla—Rolla, Mo. (Kansas, Oklahoma, Missouri, Arkansas, Illinois, Indiana): Metallurgical Branch, C. T. Anderson; Mining Branch, C. H. Johnson.

Tuscaloosa—Tuscaloosa, Ala. (Louisiana, Mississippi, Alabama, Florida): Metallurgical Branch, W. H. Coghill; Mining Branch, J. R. Thoenen.

College Park—College Park, Md. (New England, New York, New Jersey, Pennsylvania, Ohio, West Virginia, Maryland, Delaware): Metallurgical Branch, J. H. Zadra; Mining Branch, McHenry Mosier.

Raleigh—Raleigh, N. C. (Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia): Metallurgical Branch, ———; Mining Branch, M. H. Kline.

The station at Berkeley will be retained and the fundamental research work being carried on there will be under K. K. Kelly.

ARE YOU DOING IT?

Every pound of paper that gets back into packaging cartons and boxes will contribute to manpower saved in cutting, "toting" and shredding trees. Our mills need this material to package the fighting supplies so necessary to the big fight we're all trying so hard to win.

Save Paper!

American Tanks Now Waterproofed

HEAVILY-ARMORED American tanks are now so thoroughly waterproofed that they can roll off a landing barge into the surf during amphibious invasion operations without danger of becoming "drowned out."

Giant tanks can operate in six feet of water and go ashore fighting, according to engineers of the United States Rubber Company, who developed the waterproofing technique in cooperation with Army ordnance technicians.

Officials said this wartime development provided the Germans with one of their biggest surprises during the D-day invasion of Normandy. The enemy had expected to find the tanks stalled in the surf and on the beaches, their crews working frantically to get them back into operation. Instead, the tanks rolled forward with their guns blazing, overcoming underwater barricades which the Germans had erected along the coast.

The War Department is not permitting disclosure of the method used to keep water out of the vehicles.

Honor 50-Year Veterans

The first two 50-year plant employes of The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Andrew N. Van Riper and Morris G. Fitts, were honored at a dinner January 25 at Mountainview, N. J., attended by approximately 500 persons. The dinner also marked the organization of the Manhattan Pioneers, composed of Manhattan Rubber employes who have been with the company 25 years or longer. The majority of those present were members, 270 of whom are actively employed, and their wives.

By rounding out 50 years of service with Manhattan, Mr. Van Riper and Mr. Fitts joined a small group composed of three others, F. L. Curtis, vice president and treasurer, Charles H. Kuhn, of the New York sales force, and Charles E. Cummings, assistant secretary, who have been with Manhattan for over half a century.

In recognition of their service, they were presented by Sumner Simpson, president, with gold pins studded with five diamonds, each diamond emblematic of five years of service beyond the 25-year mark.

State Geologists Meet

The Association of American State Geologists has concluded its 39th annual meeting held in the offices of the Geological Survey, United States Department of the Interior. Twenty-five of the 43 State Geological Surveys were represented.

The members of the association heard addresses by Director William E. Wrather of the Geological Survey, and Director R. R. Sayers of the Bureau of Mines. Director Wrather discussed new mapping techniques developed during the war, especially the use of aerial photographs to speed up the making of maps. Using modern machinery, it is possible to produce from aerial photographs the highly accurate maps which are essential in the study of our national resources as well as for the national security. Director Sayers discussed the exploration of mineral deposits and the development of new methods of treating ores. Some of the new products produced by these methods show considerable promise of developing new industries for the post-war period, it was stated.

Dr. Robert Dott, state geologist of Oklahoma, was elected president of the association for the coming year. Dr. Edward Troxsil, state geologist of Connecticut, was selected as the vice president and Dr. Meredith Johnson, state geologist of New Jersey is the new secretary.

Tentative plans were made for a 40th anniversary field meeting in 1946. The holding of such a meeting is, however, entirely dependent upon war and transportation conditions.

Big Sandy Mines Respond to Increased Production Request

Coal mines in the Big Sandy field of eastern Kentucky broke all weekly production records during the week ending January 27, in answer to the request of the Solid Fuels Administration to help offset results of severe weather conditions in the northeastern coal states. The week's production for the district was 328,230 tons, according to H. S. Homan, secretary of the Big Sandy-Elkhorn Coal Operators' Association. The preceding week's production was 309,460 tons, also a record up to that time.

The record shipment previous to January 20 took place during the week ending September 30, 1944. This was 307,830 tons. The average weekly shipment during 1944 was 280,000 tons, not including wagon and truck mines. The year's total production, including that from wagon and truck mines and coal used locally at various plants, was 16,186,091 tons.

Central States

Evans Buys Madison Zinc Holdings

The mine, mill and lease holdings of the Madison Zinc Company, on the Thomasland, a mile and a half southwest of Baxter Springs, were recently purchased by F. W. (Mike) Evans of Joplin, well-known Tri-State mine operator. The lease holdings comprise 200 acres including the Old Iron Mountain Lead and Zinc Company, the old Euterpe, the old Peru and an undeveloped 40 acres. The land is owned by Howard Thomas, Lee Thomas, Mrs. Sterling J. Chambers, Mrs. I. T. Hocker and Mrs. C. A. Daubin, all of Baxter Springs, and Charles Thomas of Tulsa. Evans formerly operated the Empire mine on the Iron Mountain eighty and built the Iron Mountain mill. He later sold the property to the Iron Mountain Lead and Zinc Company for $350,000. Operations on the Euterpe and Peru mines were suspended last November after four years of operation by the Madison Company.

Five or six years ago, about four acres of the mined area on the Peru caved to the surface due to extensive mining over a period of years of the rich chimney of ore below. Evans and his assistant, Carl Carmean, a Tri-State mining engineer have laid plans to initiate open pit mining operations at the Peru cave-in. Carmean was engineer for the Cooley Brothers during operations at Sucker Flat, also owned by Evans.

It is planned to conduct mining operations through the use of two cable towers installed on the east and the west sides of the pit. Supporting cableway will be 2½" steel cable with a 10-ton skip which will be operated in and out of the cave vertically and horizontally by a 225-hp. electric-motor-driven Lidgerwood hoist. Two steel towers, one 75 ft. high, the other 80 ft., will support the cableway. The hoist will be installed in the west tower where a 200-ton hopper will be built to receive the waste or overburden from the skip.

It is planned to take the waste to the hopper by a feeder through a 5x12-ft trommel to remove mud and dirt. Oversize will go to a crusher over a vibrating screen and through a 40" secondary crusher. The minus ½" and the washed fine material will be disposed of as ballast. Trommel undersize will go to a drag classifier for dewatering and mud slime removal.

The cave is about 500 ft. long and 350 ft. wide, the original surface of which has slumped about 90 ft. Overburden will be loaded by Caterpillar tractors equipped with angledozers. Waste will be pushed over two ramps (each fitted with grizzly bars) into the 10-ton skip. Ingersoll-Rand wagon drills will be used to block-hole large boulders.

When the overburden has been removed, ore will be handled in much the same manner until it reaches the hopper. From the hopper the ore will be trucked to the Euterpe mill. This equipment is expected to handle 1,500 tons per 24 hours. Installation of the equipment is expected to get under way early enough for operations to commence in May or June.

State Chief Mine Inspector Resigns

John A. Skinner of Webb City, chief mine inspector for the state of Missouri since May 1941, has resigned to accept the position of vice president and general manager of the Wentworth Mining and Milling Company. Prior to his appointment as state mining chief, Mr. Skinner operated mines at Webb City, Picher and Waco. His tenure of office was characterized by a thorough administration of his duties well correlated with the national war effort.

The Wentworth Mining and Milling Company has a 30-ton per hour mill on the Kline lands southeast of Wentworth. A new shaft is nearing completion a short distance northwest of the mill shaft on the property, and Mr. Skinner is directing the sinking of two more shafts on the tract. The U. S. Bureau of Mines put down 54 churn drill holes on the property about a year ago which are reported to have blocked out approximately 500,000 tons of sulphide and siliceous zinc ore, having an average assay of 3 percent metallic zinc. L. C. Brichta, project engineer for the Bureau, has also pointed out the possibilities of additional ore reserves in a favorable formation bottoming around the 100-ft. level.

Old Whitebird Shaft Reopens

It is reported that the Bell Mining Company has reopened an old shaft on the Joseph Whitebird lease a mile northeast of Picher. Walter Stogsdill of Joplin is superintendent of the newly organized company and with him are associated Ora M. Davis of Picher, C. A. A. Sleeth of Butler, Mo., A. D. Clifton of Joplin and Cecil Parnell of Picher.

The 210-ft. shaft has been cleaned out at the bottom, with mining operations heading to the northeast. The heading, about 35 ft. high and 25 ft. wide, is expected to run from six to eight percent in blende recovery value. Ore will go to the Central mill for treatment.

A derrick has been built over the shaft and a gasoline-driven motor hoist has been installed as well as

The production slope of the Ingle Coal Company's mine at Elberfeld, Ind., will be 1,800 ft. long on a 16-degree incline—one of the longest in the country. Steel lining is being placed as shown

a 560 cu. ft. per minute Sullivan compressor which will provide air for two drilling machines. This compressor has a 75 hp. electric motor. With mining operations already under way, early shipments to the mill are expected.

The Great Lakes in 1944

In meeting Government war requirements and caring for essential civilian demands, the Great Lakes in 1944 transported the largest tonnage in history, the Office of Defense Transportation has announced.

This information is contained in a report of bulk-cargo Lake shipments, made by Lawrence C. Turner, head of ODT Waterways Transport Department, to Col. J. Monroe Johnson, director of the ODT.

The total 1944 tonnage of the five most important Great Lakes commodities—iron ore, bituminous coal, anthracite coal, grain and limestone—amounts to 184,155,384 net tons, the report said. This is an increase of more than 8,000,000 tons over the 1943 figure, and more than 1,250,000 tons over 1942—hitherto the record year for Great Lakes shipping.

The Great Lakes carried in 1944: Iron ore, 90,911,003 net tons; bituminous coal, 58,747,203 net tons; anthracite coal, 1,416,127 net tons; grain, 16,228,880 net tons, and limestone, 16,852,171 net tons.

"The 1944 shipping season was 277 days long," said Mr. Turner, "and 443 American vessels as well as numerous ships of Canadian registry were employed in the trade. For the first time in history the combined Lakes movements of bituminous and anthracite reached the 60,000,000-ton mark. Grain shipments increased enormously, totaling 583,880,803 bushels. Of that total, wheat principally from the Lake Superior region totaled more than 420,000,000 bushels.

"One gets an idea of the ability of the Great Lakes fleet to meet all war demands when it is considered that in each of the past five years, since the beginning of the nation's defense program in 1940, the bulk freight movement has exceeded that of the largest peacetime year—1929. In that year the Great Lakes carried something over 138,000,000 tons. This achievement would have been impossible in the face of wartime manpower shortage, without the untiring exertions of the crews, officers and operators of the Great Lakes fleet."

Eagle-Picher Acquires Southern Lead Company

TEX.

Acquisition of production and distribution facilities of the Southern Lead Company, Dallas, Tex., by the Eagle-Picher Lead Company, effective at once, was announced recently by J. M. Bowlby, Eagle-Picher president. Products of Southern Lead will be sold under Eagle-Picher's label but personnel of the Dallas plant will be retained.

The Southern Lead Company's plant is situated on an eight-acre tract in Dallas. Though it formerly consisted chiefly of a smelting operation, it now includes a fabricating plant which made die castings and served the battery and plumbing industries with pig lead, roof flashings, solders, lead head nails, antimonial lead and allied products. The present fabricating equipment will be augmented with pipe and solder presses, extrusion machinery to make traps and bends, roof flanges and lead wool, also new die casting equipment. At present the Dallas concern is producing die castings for the Navy. In the post-war period it is contemplated that the die casting facilities will be diverted to civilian use.

J. V. Murph

J. M. Bowlby, president of Eagle-Picher, said that the acquisition brings to the company the valuable services of the Southern Lead Company personnel and provides additional manufacturing and distribution facilities in the southwest, also increased smelting capacity and broadening of die castings, serving many additional industries.

J. V. Murph will serve as general manager, D. B. Murph will be in charge of production and D. H. Murph, founder of the company, will remain in a consulting capacity.

Facilities of the Texas and Pacific Railroad will be augmented by a fleet of transport trucks also acquired under terms of the agreement.

Removing Equipment at Lake Superior-Holmes Mine

MICH.

The Oliver Iron Mining Company has stopped work at the Lake Superior-Holmes mine, at Ishpeming, Michigan, due to exhaustion of ore and is taking out the mining equipment. During the past two years the company has carried out an extensive program of dewatering the old workings and driving exploration drifts without locating any new ore to justify further operations. The operation has produced consistently for many years.

The Oliver company took over the Holmes from Cleveland-Cliffs in 1930 and through its shaft exhausted the Section 16 mine to the south and the Hard Ore mine to the north. The three mines have produced a total of over 17,500,000 tons of iron ore in the period 1888 to 1943. The Hard Ore was one of the first producers in the district with an unbroken record of shipments up to 1915 running nearly to 6,000,000 tons.

The company will maintain its office at Ishpeming as it holds a number of reserve properties on this range. Frank Knight is superintendent.

Shaft Sinking

(Continued from page 37)

has a tendency to ball or form a sticky mass.

It may be economical to increase the size of the center hole if the ground is blocky and it is difficult to obtain proper fragmentation to insure free running of the muck through the churn-drill hole.

A circular shaft has numerous advantages from a structural standpoint as well as being ideal for ventilation. The circular opening, particularly with flat-lying formations, requires minimum support for the shaft walls, and the circular steel lining furnishes the strongest resistance to lateral pressures for a given weight of metal.

Adaptation of Method to Meet Stated Conditions

Deeper Shafts

The depth of 147 ft. attained in the escape shaft is nearly the practical limit for hanging a continuous section of steel lining from one support. A concrete bearer at the required intervals is recommended in deeper shafts, depending on the weight of lining used.

This recommendation is contingent upon the ability of the rock walls to give proper support for a concrete ring. In constructing such a ring, a footing should be provided by cutting a hitch in the rock and pouring concrete between the steel lining and rock walls to a height of three or four liner-plate rings.

Unstable Horizons in the Rock Formations

In sinking a shaft, unstable horizons that were not disclosed by drilling and other mine openings may be encountered. In sections of the shaft requiring special support, it is suggested that a concrete lining be installed by pouring concrete behind the steel lining, the same way that the concrete ring previously mentioned was placed. Half sections of the liner plates should be available to permit replacing full plates and providing openings for pouring the concrete.

Acknowledgment

The writer wishes to acknowledge the cooperation of the officials of the Ingle Coal Corporation, through W. D. Ingle, vice president, in furnishing the data used in this paper.

Western States

Colorado Drainage Tunnels

According to figures released for 1944, the Carleton Tunnel of the Golden Cycle Corporation at Cripple Creek, Colo., is making an average of 4,500 g.p.m. All wooden timbering in the tunnel was replaced during the year with second-hand steel which the company had on hand. This six-mile tunnel was driven by the Golden Cycle Corporation in order to drain the area to a depth of 3,300 ft. It was completed in 1941.

Golden Cycle treated 114,250 tons of Cripple Creek ore at its Colorado Springs plant and 107,550 tons of lead-zinc-copper ore in the converted unit of its mill.

The Leadville drainage tunnel, according to reports, is being driven at the rate of 30 feet a day, although the contractors (Stiers Brothers Construction Company) expect the rate to reach 40 to 50 feet a day in the near future. The heading is an area known to be ore bearing and operators expect to encounter lead and zinc within the next few months.

Manpower From Adams Tunnel

The Adams tunnel, designed to bring irrigation water from the western slope of the Continental Divide to the eastern slope in northern Colorado, now has only a few workers on the job to maintain it on a standby basis until late in 1945. This procedure is expected to result in more manpower for the mine. The War Manpower Commission's workers in the district have offered jobs in mines and war industries to the 200 men engaged in lining the long tunnel (13.1 miles) and many of them who were formerly miners have gone back to the mines.

The Adams tunnel was holed through last June and operations since that time have been concerned with scaling to size and lining with concrete before placing in use for water transportation. Farmers on the eastern slope who have bought the water had held hope that the tunnel might be finished to bring at least some of the water for the 1945 crop season.

Correction

"Please refer to the last paragraph of the first page of my article 'Rocky Mountain Quicksilver,' which appeared in your January issue. In that paragraph I attempt to describe the geology of the Smith Mercury Mine, and I say, 'The property is something of a jigsaw puzzle geologically speaking.'

"To any one who cares, the description following that sentence should be somewhat less of a puzzle if the word 'to' is substituted for the word 'of' in the phrase '1,800 feet south of the quartzite-limestone contact.'

"The whole sentence being corrected should then read: 'Starting from the north, the ore lies between an east-west fault in quartzite, 1,800 feet south to the quartzite-limestone contact; the latter also running approximately east and west.'"

"WORTHEN BRADLEY."

Another Bubble Dance !!

Manpower Priorities

Critical need for increased lead production to meet the demands of war brought action by the War Manpower Commission when its placement officer at Albuquerque, J. C. Mitchell, and George N. Tribble, of the WMC Utility Division, were sent to Silver City by State WMC Director L. E. Ruffin to assist the Silver City district United States Employment Service office in securing additional labor needed by mining companies. High priority was given the Peru Mining Company and the Black Hawk Consolidated Mines Company. Available miners and muckers will be shifted to this area to meet a serious shortage of labor.

Bill for New Mine Inspector Set-up

Pending before the New Mexico Legislature and slated for enactment into law at the present session is a companion House and Senate Bill, relating to the State Inspector of Mines; creating the position of Deputy State Inspector of Mines, defining the duties thereof; providing the method of appointment and setting salaries to be paid. The bill would increase the salary of the State Mine Inspector from $3,000 annually to $3,600 a year, and the Deputy Inspector would be paid $2,400 a year. Appointment of the inspector and deputy inspector would be made by the governor, after applicants had been examined by a board composed of the state engineer, the president of the New Mexico School of Mines, and the Governor.

Gallup Coal Mine to Close

Announcement was made March 1 by Clarence Uhland, resident manager of the Gallup American Coal Company at Gallup, McKinley County, that New Mexico's largest coal mine operations would suspend March 31. Approximately 400 miners will be affected by the shutdown. The closing order was confirmed by Horace Moses, general manager of Chino Mines Division of Kennecott Copper Corporation, and also of Gallup American Coal Company. Loss of markets for the output of this mine was given as the reason for abandoning operations. Most of the coal from Gallup American previously was used by Chino Mines, since the company was owned and operated by Kennecott, and also by the Atchison, Topeka & Santa Fe Railway Company. Chino Mines for several years had used natural gas in its smelter and the railroad company has largely converted its motive power to oil burners and Diesel locomotives. Gov. John J. Dempsey has taken the closing of the mine up with Secretary of the Interior Harold L. Ickes in Washington, solid fuels administrator, in an effort to keep the Gallup American coal mine producing to meet a nationwide coal shortage.

New Potash Mining Firm

The Southern Potash Co., capitalized at 500,000 shares of $1 par value, has recently been examining potash properties in New Mexico and Texas. It is expected soon to start extensive core drilling on its leases near Carlsbad. W. A. Snyder of Denver is president.

Pershing Quicksilver Operations

Treating cinnabar in two tub retorts, lessees are working on property of the Pershing Quicksilver Company in the Antelope Springs district in southern Pershing county, at one time the state's largest producer of mercury. The two lessees who are experienced "chloriders" are understood to be mining "spots" of high-grade cinnabar from fringes of old productive stopes with good results.

Aurum District Shipments

Reports reaching Reno from Salt Lake City are to the effect that the Grand Deposit Mining Company in the Silver Mountain or Muncy Creek section of the Aurum district, some 30 miles northeast of Ely in White Pine county, was producing about 10 carloads of highly-complex ore monthly for shipment to a Utah smelter. The ore contains gold, silver, copper, lead and zinc. The Aurum district was discovered in 1871 and has been active intermittently since that time. In early days silver was the principal product, lead, zinc and copper being developed later.

Errata—February Issue

Page 55: Bottom of page picture title should read "native" copper—not "negative."

Page 100: Third column, fifteenth line, replace "liquidation" with "liquation."

High Zinc Output

According to the U. S. Bureau of Mines, zinc production in Idaho exceeded the lead production by 5,500 tons for the first time in the mineral history of the state. The bureau lists Idaho as the second largest producer of lead in the United States, second to Missouri, and the largest producer of zinc in all the western mining states. The state's lead output is estimated at 80,500 tons and the zinc output at 86,000 tons. About 75 percent of the lead and 93 percent of the zinc came from the Coeur d'Alene mining district in Shoshone county. The sharp increase in zinc is credited to the output of the new zinc fuming plant at the Bunker Hill smelter at Kellogg, which is treating a huge accumulation of cold smelter slag mixed with current hot slag.

Chester Vein Progress

Production of lead-silver ore from the Chester vein for 1944 totaled 91,956 tons, according to R. D. Leisk, manager of the Sunshine Mining Company, operating the Chester vein in separate partnership with three other companies, Polaris, Silver Syndicate, and Silver Dollar. No production was made from the Sunshine mine except for 3,298 tons mined during the first quarter of the year. Total net smelter returns for the year amounted to $3,569,702 and included payment for 4,137,163 ounces of silver, 11,374,495 pounds of lead, and 913,429 pounds of copper. The Chester ore body now has a reported length of 800 ft., varying in width from 4 to 25 ft. in width and has been opened for a vertical length of 1,400 ft. The ore has been blocked out from the 3,100 level up to the 2,300 and the downward extension of the shoot has recently been located on the 3,700-ft. level, 1,000 ft. below sea level.

Report on Callahan Consolidated

Net profits of the Callahan Consolidated Mining Company, of which Donald A. Callahan is president, totaled $30,922.96 before depletion, depreciation and taxes, for the last quarter of 1944, according to a company statement. Net smelter returns for ore shipments during the period were $66,482.66 and operating expenses $35,559.90. Estimated value of ore in transit totaled $18,542.36. The company operates the old Rex mine, which it has equipped with a modern milling plant.

Extra Pay for Night Work

One thousand employes of the American Smelting and refining Company at Tacoma will receive extra pay for night work due to action by the Non-Ferrous Metals Commission of the NWLB. A previous award had given premium pay of 3 cents to 5 cents a shift for night work retroactive to July 1, 1943. This was increased to 4 cents and 8 cents, retroactive to July 1, 1944, on the basis of industry practice upon union petition.

The company and the union have negotiated a vacation plan providing for one week's vacation after a year's service and two weeks after five years. This has also been approved by the same commission. Union's demands on sick leave issues, guaranteed wages, severance pay and the 17-cent general wage increase were denied. This is subject, however, to reopening upon request of either party if the National War Labor Board changes its policy.

—*Worthen Bradley*

Champion Sillimanite Has New Standby Plant

It is reported that Champion Sillimanite, Inc., has installed a new 50 kw. Bardco standby plant in Chalfant Valley, Inyo County, Calif. Prime power source for the new plant is a 6-cylinder Waukesha gas engine which has been set up near the company's hydroelectric plant, currently in operation. The company has also recently been engaged in diamond drilling for ore deposit extension and is conducting its andalusite and diaspore mining at the mine both by open cut and underground methods. George W. Clarkson of Laws, Calif., is mine superintendent, and the company maintains offices at Merced, Calif. President and general manager is Dr. J. A. Jeffrey of the Champion Spark Plug Company in Detroit, Mich.

Prepare to Operate You Bet

It is reported that the partnership, Fredericks and Ferrin, plans to operate the You Bet gravel property east of Nevada City, Calif., as soon as the gold mining ban is lifted. It is moving its 30-ton dredge from the Gilmore field, near Grass Valley, Calif., to the You Bet mine. The dredge is an underground digger especially designed in San Francisco and originally assembled in Grass Valley. The You Bet has been idle for several years. It is now under lease by Phil P. Fredericks and Harold Ferrin, both of San Francisco, from Alpha Stores, Ltd, the owner, of which F. F. Cassidy, Nevada City, is president. About 2,000 acres are included in the lease.

Cerro Gordo Increases Shipments

Imperial Metals, Inc., reports a considerable increase in its shipments of silver-lead ore from the Cerro Gordo mine. A previously unworked deposit, discovered recently during the company's diamond drilling program, is the principal source of production.

Located in Inyo county, near Keeler, California, the property has been in production under the present management for over a year. Maurice Albertoli of Keeler is mine superintendent and Sam B. Mosher of Los Angeles is president of the company.

Graduate and Research Fellowships

ROLLA

Graduate fellowships of the Mining Experiment Station are open for the academic year 1945-1946, at Missouri School of Mines and Metallurgy, Rolla, Missouri. Advanced academic work and research leading to Master's and Ph.D. degrees may be taken in Mining (including the Mining Geology and Petroleum options), Ceramics, Metallurgy, or Geology. Applicants should address inquiries to Dean Curtis L. Wilson at the above-mentioned school.

SALT LAKE

The Department of Mining and Metallurgical Research at Salt Lake City is offering several Research Fellowships for the academic year beginning September 1945, each carrying a stipend of $600. Fellowshipmen are exempt from the non-residence fee. The other university fees average about $100 for the school year.

Fellowships are open to college graduates with proper background in mathematics, chemistry and physics. They become candidates for the degree of Master of Science. Normally the requirements for the degree can be met in one year, but this depends on the undergraduate training and the work done during the year.

Small Mines' Securities and Their Financing

By ALLAN S. RICHARDSON

Securities Commissioner
State of Colorado

AS CHAIRMAN of the Mining Securities Committee of the National Association of Securities Commissioners, I desire in this report to digress from the traditional attitude of criticism toward mining securities and instead endeavor to point out the peculiar position mining as an industry holds in our economy.

It has, in the past been and to a lesser extent now is only too true that the lure of relatively easy mineral wealth has appealed strongly to the unwary investor and in consequence the usual swarm of locust-like promoters, swindlers and confidence men has swooped down upon the lush fields of accumulated wealth to extract the savings of the willing weak-minded public and in exchange for cash, give certificates of stock in an alleged mining enterprise.

Is it quite fair, I ask, to allow this tradition of skepticism of mining to persist? I was in the investment business for more than 25 years before entering the field of security regulation. My memory is not so dim but that I cannot vividly recall the losses said to run to many billions of dollars in real estate mortgage bonds issued by companies whose records boasted of so many years without a loss to any investor. Yet we do not frown upon real estate mortgages or mortgage bonds as we are too prone to frown on mining as a medium of investment.

My memory is also alert to the billions lost in foreign credits sold to American investors by investment banking firms whose names and titles are still among the most widely known and best respected in their field of business. Yet we do not raise an eyebrow when these same salesmen bring out a deal of any usual kind. Should these dignified names that grace the industry of securities distribution offer a mining stock, the shoulders of many of their competitors would shrug and some one might give expression to the thought many would entertain, "Has so and so gone nuts?"

I suppose the reason for the lack of realism concerning mining as an industry is based upon the negative virtue of ignorance. When the avaricious skeptic who lost his money in some mining venture later raised his voice in protest so the whole world would hear, others, too, joined their voices with his and the tumult and the shouting left an echo that still is heard the length and breadth of our fair land. The loser in real estate mortgage issues and foreign credits may have been sorry for his losses, but the credulous speculator in mining stocks in addition to his sorrow adds anger at the sacrifice of great promises of potential profits which he has thus been denied. In other words his cry is louder because of the dashed hopes. He has little sympathy for the investor who only lost his money.

Last winter the Colorado Mining Association and the American Mining Congress held a joint conference in Denver. This meeting was attended by many whose names are prominent in politics and government. To this meeting was addressed a letter from the President of the United States. Over his signature Mr. Roosevelt wrote:

> "During the past two years, the dependence of the Nation on many of its domestic ores has been amply demonstrated. Fortunately, the mining industry, with the help of Government loans, subsidies, price

Presented to the recent annual meeting of the Association of Securities Commissioners, St. Louis, Mo.

premiums, and other forms of aid, has been able to provide, during this extraordinary period, the metals and minerals that have made possible the record production of ships, guns, tanks, airplanes, and the other weapons of war. We will have to continue to produce the mineral raw materials essential to the prosecution of the war, laying aside all considerations not compatible with this prime objective until victory is definitely and irrevocably ours.

"Without losing sight of the arduous tasks ahead of us, we must bear in mind that the mining industry, like agriculture, is basic to the national welfare, in peace as well as in war. To exist and prosper, our Nation must have a strong and self-sustaining mining industry. The Federal Government should do all it can to foster its development on that basis."

Now, let us get the straight on this matter. To him who still thinks of mining as an industry that deals principally in gold and silver I will say, "You are old fashioned! Mining today is a vastly different matter, and must be judged in the light of modern metal uses and industries, political and international implications."

Having in mind this new concept of the mining industry, let us give thanks that others realized the fallacy of deprecating the industry and to them give credit for the winning of our wars and for the making of our living standards what they are today.

Mines may be classified in three principal groups:

(1) Those producing basic necessities, coal, iron ore, copper, lead zinc, clay, salt, potash, etc.

(2) Those producing strategic metals, and alloys, including molybdemum, manganese, nickel, bauxite, chromium, platinum, tungsten, vanadium, antimony, fluorspar and many, many others whose names and uses are all but unknown to most but needed and enjoyed by all.

(3) Those producing the so-called precious metals, gold and silver.

The economists are pretty well agreed that America stands upon the threshold of the greatest era in her glorious history. If this be true, and I feel confident it is, then a more realistic attitude toward the mining industry must prevail. All of our modern material ways of life depend upon machines and these machines are no better than the metals out of which they are fashioned. These metals come from the good earth herself, the mother of modern inventions. The union of her bounties with the genius of man's scientific mind gives the fruitfulness we all enjoy. We ride over shimmering steel rails reinforced with her elements. We drive along highways in machines where safety and precision of manufacture give to transportation a new meaning. We fly through the heavens in devices whose structure, control and directional apparatus are but the evidence of more of her bounty and generosity.

Vast accumulations of buying power and a pent-up demand for consumer goods are but a signal of the greater need for these bounties of our soil.

The thoughtless say there are no new frontiers. Even if they refer to new acres of our earth's surface they hardly tell the truth. For who knows, when some prospector's jackass pawing through the snow for grass to nibble on will uncover another priceless deposit of galena ore as happened when the great Bunker Hill and Sullivan lead mine was discovered in Idaho a few years ago.

But they forget the millions of cubic miles beneath the visible face of the land. There are yet to be found and developed vast treasures not even now known. Yes, these new frontiers are closer than many suspect, far closer than the distant mountains and stream beds where visible geology displayed its treasure to the unpracticed eyes of the covered wagon pioneer. While these early day prospectors were struggling to cross the prairies to the gold fields of Colorado and California, iron waited undreamed of in the Missabe Range, lead lay under the grass lands in Missouri, coal ripened in Illinois and the now known mineral deposits in Arkansas were seeking release from their prisons on the eroded slopes of the Ozark hills.

Who then is to say there are no new frontiers?

Who is there to say the mineral resources of our land are exhausted, just because they are not visaged by the naked eye?

To us who supervise the flow of capital into industry is thrown a challenge. The responsibility is ours to avoid the pitfall of the skeptic or the morass of the thoughtless. That challenge is to clear our heads of prejudice and aid in every legal way the encouragement of the economic welfare of an industry upon which our all depends.

There are among us those who stand in high places and urge the subsidy with American tax dollars of foreign sources of mineral wealth. They would stifle our own hard-rock miner into the abandonment of his hard-worked mine and exploit the deposit of a neighbor nation whose labor cost of but a few cents per day poses a problem of unfair and unreasonable competition against our own citizens, and will if carried out to a conclusion tend to eliminate a means of livelihood for literally millions of our own people. Labor costs in American mines, I am advised, amount to 60 percent of production values, in addition to all the legion forms of taxes. In the interest of these men and their families, I ask why should our tax money be used to undermire their right to the American way of life?

It may be answered that the only way to balance foreign trade accounts due us or to settle lend-lease obligations owed us by foreign nations is to accept raw materials from these nations. But who would be so bold as to suggest that Americans drive cars only of Russian manufacture or dress only in fabrics from far Cathay. Yet this is what is being urged in high places against the mining industry, and in the name of good neighborliness. Would our farmers be content with a foreign policy that required turnips from Turkey, or pork from Peru. Would they subscribe to a plan that required Americans to use only cotton from the land of Cleopatra or wheat from the down under continent of Australia.

We tried this plan once when Americans wanted oil from Mexico. Then came expropriation.

We tried it again to gain tin from Bolivia. Then came revolution.

We tried it once more in depending on the Malay States for rubber. Then came the Japs.

Now let's use some horse sense. If we finance foreigners to our own cost, we will have to relearn the lesson that the best way to lose a friend is to lend him money. Many such friends in the past have defaulted against us. Some have simply said come and get it. But this we never do. Commissions of inquiry have inquired, but in the end we have always paid. Suppose for example we finance our foreign friends and some of them gang up on us. To say there will be no more wars is to speak with childish words. Two babies sucking at the same breast fight to be first if they are hungry. The effort of survival is primitive. Man in the last analysis is primitive. Realism rules. Where will our country be when we build stockpiles of foreign products, whether of mineral or of other materials and leave our domestic industries prostrate? Fair game for the aggressor of a coming generation.

Against these competing sources our miners will run in leaden shoes.

Friendly nations, Mexico, Bolivia, the British Empire Malay States failed to fulfill their contracts. What if they were unfriendly? I leave it to you gentlemen.

The mining industry has been called predatory. With this unfair and untrue statement I take emphatic issue. If, however, there is anything connected with the industry to which that term might fairly be applied, it would have to be those wolves and jackalls who have seized upon its very essentiality as a basis for lurid promises and unreasoning and impossible assurances of gain. Against

these prowlers of the public purse and thieves in promoters' pants we wage relentless war. To be sure their ilk is found in other fields as well and we must hit this enemy wherever and whenever we can find him.

I spoke a moment ago of man as a primitive animal. Nowhere is this more true than when man clothes himself with the garb of suavity and becomes a marauder of widows' mites and with a voluble vocabulary persuades the unwary that he has in his grasp the pot of gold from the end of a rainbow which he is now magnanimously offering for a penny a share, or what have you to trade. Such as these to use a Freudian phrase, are morally unsocial. They lack the milk of human kindness and in the pursuit of that vicious vocation, exemplify man's inhumanity to man.

Fortunately, our laws, both Federal and state, now have authority to hold in check their depredations. Let us as enforcers of these laws, learn discrimination.

Mechanical Mining Systems

(*Continued from page* 30)

set-ups the motivating thought is to eliminate the car change time.

Mobile Loading Into Shaker Conveyors

The use of mobile loading in conjunction with shaking conveyors as the primary transportation medium is relatively new. This system is an offshoot or branch of the chain conveyor system. However, using shaking conveyors in place of chain conveyors has made it possible to overcome some disadvantages. For instance, while it is true that by using chain conveyors as a primary transportation medium for mobile loaders, a continuous method of taking coal away from the loader has been attained, the chain conveyors are rigid and cannot be extended or retracted, or moved sideways to permit loading out a wide room. The usual set-up when using chain conveyors for primary haulage is to lay the conveyor in the middle of the room, the room width being determined by the reach of the loader itself. Furthermore, since chain conveyors are narrow, about 14 inches, it is hard for the loader operator to "hit" the conveyor so he just loads "at the conveyor" and the spilled coal is hand shoveled later.

By substituting shaker conveyors for chain conveyors but otherwise retaining the general features used with chain conveyor set-ups, (25), (26), (27), two disadvantages are eliminated: these are the rigidity of the set-up and the inability to move forward and backward during the loading operation. By using shaking conveyors for primary coal transportation, and replacing the duckbill with a large loading pan (retaining the swivel) it is possible to have a very flexible unit. This flexibility approaches that of using shuttle cars with the added advantage of continuous service to the loader. By using a 45 degree swivel any width room can be accommodated. The use of swivel and telescopic pan will also permit moving the "loading pan" back and forth and sideways across the room—always within reach of the loader.

Thus when using the shaking conveyors for primary transportation we not only eliminate the 35 percent to 40 percent "car change" time, but we also reduce the 10 percent to 15 percent time now spent on tramming, because of the wide places it is possible to load out with this system. Naturally both these savings are converted into "load coal" time; hence increasing the productivity of the mobile loaders. With this system of mining it is perfectly possible to attain a face production of from 30 to 40 tons per man-day including all labor necessary to cut, drill, shoot, load coal, timber, etc., which indicates a cost of 26 to 30 cents per ton. But to attain this figure it is necessary that the operator select the equipment best suited for this type of work, that he avail himself of good, sound, well-informed engineering service and that every piece of equipment is properly installed.

Wheels of Government

(*Continued from page* 53)

clearly the established accounting method and OPA does not have the right to prescribe some other method.

"Intangible Drilling Costs"

A U. S. Tax Court ruling in the case of F. H. E. Oil Company and Fleming-Kimbell Corporation, disallowing deduction of "intangible costs" of oil well drilling as an expense, has been upheld by the Fifth Circuit Court of Appeals in New Orleans. The Bureau of Internal Revenue has announced that it does not intend at this time to follow the Court's decision. It is probable that a motion for rehearing of the case by the full Circuit Court will be filed and in the meantime bills to overcome the effect of the Court's decision have been introduced by Representatives Reed of New York, Carlson of Kansas and Stigler of Oklahoma.

Premium Metal Prices

Now in the House Committee on Banking and Currency, the Hayden-McFarland bill, S. 502, extending payments with respect to strategic and critical metals and minerals and a number of other commodities to June 30, 1946, has been delayed by the Easter recess. Objection made by the State Department caused an open hearing on the measure before the House Committee on Banking and Currency on March 26, at which Charles P. Taft submitted a letter from Undersecretary Grew which set forth that "the guarantee of subsidies on the present scale to domestic producers for more than a year, while commitments to suppliers in foreign countries are limited to a three-month period, would have the effect of confining any necessary reductions in the procurement of these metals to foreign suppliers until June 30, 1946, regardless of the relative cost. It is readily conceivable that as a consequence this government might be obliged to continue purchasing, for example, domestic copper at a price as high as 27 cents per pound and be obliged at the same time to refrain from purchasing copper produced abroad and offered for sale at 12 cents per pound or less. This would have the effect of raising the tariff on copper to 15 cents per pound or more for a limited period of time as compared to the existing excise tax of 4 cents per pound. I feel sure you can readily visualize the effects of such action on the other American republics and indeed on all the United Nations."

This exception taken by the State Department, coupled with the request of RFC for a modification of the Fulbright bauxite amendment, blocks the quick reporting and passage of the bill although further hearings and a report have been promised soon after the Easter recess.

Stockpile Bill

As Section 22 of the Surplus Property Act enacted last fall is effective only until January 2, 1946 in its "freeze" of strategic materials declared surplus by the Government-owning agencies, it has become very important that a stockpiling bill applying to surplus war metals and minerals be enacted in the present session of Congress. Companion bills of this nature, S. 752 and H. R. 2624, have been introduced by Senator Elbert D. Thomas and Representative Andrew Jackson May, the chairman of the Military Affairs Committees of the Senate and House.

Amending the strategic materials act of June 7, 1939, known as the Thomas Act, these bills create a Stockpile Board under the chairmanship of the Secretary of War with

four additional members consisting of the Secretaries of Navy, State; Interior and Commerce. This Board would control the defense stockpile and is directed to prepare two lists of strategic and critical materials consisting of (A) materials for which stockpiling is deemed the only satisfactory means of insuring an adequate supply for a future emergency, and (B) materials for which stockpiling is recommended only to the extent available for transfer from government agencies; provision being made for transfer of materials from Group B to Group A. "Material" is defined to mean "all commodities (except petroleum) in raw, partly processed, or refined form appropriate for industrial use, including ores, concentrates, alloys and scrap susceptible of economic conversion to a form suitable for stockpiling but not including fabricated or semi-fabricated articles which in the judgment of the Board are not scrap and are unsuitable for stockpiling."

The Board is directed to acquire additional quantities of these strategic and critical materials to bring the stockpiles up to the minimum quantities specified in the ANMB report at prices not exceeding the current open market price, and to provide for storage and maintenance on military and naval reservations, or elsewhere. The Board is required to make annual reports to Congress, and materials may not be released except for rotation, by reason of obsolescence for war use due to technological changes, or under specific authorization of Congress. Release by reason of obsolescence may not be made until six months after a report to Congress setting forth the facts and the plan of disposition proposed.

Due to the heavy schedule under which Congress is laboring it may be several weeks before the respective committees begin consideration of these bills.

American Society of Lubrication Engineers Organized

Lubrication engineers representing various industrial and educational groups, have organized a non-profit group to be known as the American Society of Lubrication Engineers. Membership will include representatives of machinery builders, lubricant manufacturers, consumers and the educational field. The new organization has this aim: "To promote the subject of lubrication in the various educational institutions to better prepare future members of industry for a more complete understanding of the operational problems to follow."

MANUFACTURERS FORUM

$625,000 Building Program

Officials of the Cummins Engine Company, Inc., Columbus, Indiana, have revealed plans for the immediate construction of a new building which will permit them to double present production of the heavy-duty Model L Cummins Diesel.

Authorized by the War Production Board, this expansion of production facilities comes as the result of the urgent need for heavy-duty prime movers in several essential industries. The demand is particularly great in the petroleum industry, where more engines are needed in existing fields to increase production, and also to permit exploratory drilling on a greatly enlarged scale. A part of the double production of Model L's will go to the railroads for installation in new switching locomotives and the remainder will be employed in certain types of construction, logging and mining equipment, fishing boats and work boats.

The project will cost $625,000 and will be financed entirely by the company. Although details regarding construction have not been disclosed, the building will be a fireproof, one-story structure, modern in every detail. Overall dimensions are 80 feet wide by 470 feet long, providing an additional 35,000 square feet of floor space. It will be erected on the site of a factory parking lot, next to the injector and fuel pump building. Company officials expect the new addition to be completed and ready for use by the third quarter of 1945.

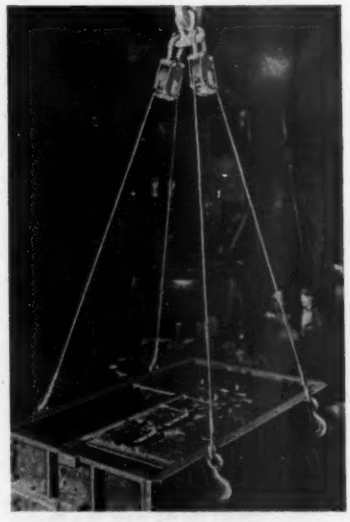
New Policy Blasting Cap Construction

All electric blasting caps now being produced by E. I. du Pont de Nemours & Co., are said to have two improvements—nylon-insulated wires and rubber plug closures. These developments resulting from research on explosives have been called the "greatest advances in electric blasting caps in half a century." Both the nylon and the rubber for the new caps are allocated by the War Production Board to speed the war effort.

The wire covering of tough, abrasion-resistant nylon is reportedly the equal of enamel insulation in preventing current leakage, is not affected by extreme or rapid changes in temperature and is in brilliant colors, minimizing the possibility of error in connections. In addition to reducing the possibility of misfires, the new wires are clean to handle and resist kinking. Formerly, blasting cap wires were covered with impregnated cotton. The rubber plug closures, double crimped in the shells, replace the combination of bridge plug, asphaltic water-proofing and sulfur seal, thus increasing resistance to water penetration. The new shells are much shorter than the old type without sacrificing explosive strength. Thus priming is said to be made easier and safer.

New Sizes in "Level-Lift" Slings

The complete line of Macwhyte Caldwell "Level-Lift" Slings are now made in ¾-ton, 1½-ton, 3-ton, and 6-ton capacities. Formerly made only in 3-ton and 6-ton capacities, increasing demands for smaller units led to the addition of two new sizes, ¾-ton and 1½-ton.



The operation is reported to be simple. After the light-weight block containing wire rope is put on the crane hook, the crane operator spots the crane hook over the approximate center of gravity of the load and the floormen attach the sling to the load. The crane operator then applies the power to lift the load, and as the crane hook is lifted, the rope automatically adjusts itself through the "Level-Lift" block. In so doing, one sling leg of rope becomes longer than the other, and as the weight of the load pulls on the wire rope, the sheave in the block pulls down against a brake which prevents slippage. The load is then lifted level.

Should the crane operator not get the block and crane hook close enough to the center of gravity of the load, it is only necessary for the operator to lower the load enough to relieve tension on the sling which releases the brake and then move the crane hook over a little to the true center of gravity. On applying the power, the ropes are said to readjust themselves and the load rises level. Macwhyte Company will be glad to send Folder No. 44-71 upon request.

New Lightweight Standardized Idler Sheaves

Lake Shore Engineering Company's plate steel and plate aluminum rubber-lined idler sheaves are said to be finding wide application in the mining industry as replacements for cast iron idler sheaves. The advantages of the plate steel and plate aluminum sheaves over their predecessor are greatly decreased weight and less friction. The cast iron idler sheave weighs 288 lbs. as compared to 115 lbs. for the plate steel, and 86 lbs. for the plate aluminum.

All idler sheaves manufactured by Lake Shore are standardized with a 20-inch diameter and 3-inch bore. This permits interchangeability of sheaves, liners, plates, and roller bearings.

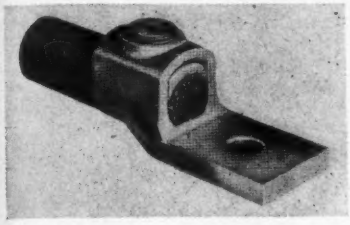
Hyatt roller bearings are standard in the steel and aluminum sheaves. It is claimed that this feature reduces friction, requires less lubrication, reduces maintenance, and minimizes or eliminates bearing and shaft replacements.

Other features of the steel and aluminum sheaves include bell mouth design, to eliminate tendency of rope to jump out of the sheave; replaceable one-piece rubber liners, which reduce wear and prolong rope life, and which are securely locked in position; and demountable side plates.

Literature is available upon request. Write Lake Shore Engineering Company, Iron Mountain, Michigan.

New Connector Lug

In response to a demand for a solderless lug that would accommodate more than one size of wire, the O. Z. Electrical Manufacturing Co. of Brooklyn, N. Y., has developed a new combination Type "XL" lug. Made of cast copper alloy, this fitting is so designed that high clamping pressure



is exerted by the pressure plate. This is also said to insure high conductivity on any one of the wires in a wide range of sizes. Socket wrenches are furnished without cost.

Complete details of this and other new products, together with the regular O. Z. line are given in a new 140-page catalog. It illustrates and describes, with specifications and price lists, the full O. Z. line.

New Transmission Belt

Reputed to be the greatest advance in the last two decades in transmission belts, the new "Compass 250" transmission belt which utilizes steel cables instead of cord or fabric for the carcass is announced by the Goodyear Tire & Rubber Company. The new belt is said to be developed especially for postwar machinery and equipment.

The steel cables are encased in an envelope of nonload carrying fabric. The cables consist of a special twisted, finely stranded, high-tensile wire. Half the cables in a belt are twisted to the left and the other half to the right to insure a neutralized, true-running belt.

The belts are made with synthetic rubber to resist lubricating oils or other deteriorants. Another advantage is said to be better life under conditions of high temperature, inasmuch as the load-carrying steel cables are not as adversely affected by heat as load-carrying cotton cords or duck in conventional transmission belts would be.

Although the cost of these belts, per inch of belt width, is higher than for conventional transmission belts, it is stated that actual economies are possible because correspondingly narrower belts can be used for specific power loads. In addition, narrower face pulleys can be used. Drives thus become more compact with resultant space savings.

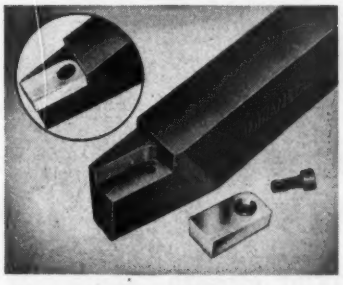
The new belts are reported to be practically stretchless and shrinkless. Once operating tension is established with this type of belt, it will seldom if ever require taking up, according to the Goodyear executives. This adapts the belt also to very high-speed drives where it is able to accept the tension developed by centrifugal force and still maintain a high tension capacity for load-carrying.

Nearly complete elimination of "creep" on the pulleys is said to result in power savings, in an improvement in speed regulation from no load to full load to peak load, and in marked reductions in pulley face and belt face wear.

New "Screwed-on" Tool Blanks

Kennametal Inc., of Latrobe, Pa., has developed a new type of Kennametal tool blank having a drilled and counterbored hole to provide for attachment to steel shank by means of a recessed-head cap screw. The angularly-set screw serves merely to hold the tip against the recess walls, which resist the main cutting thrusts.

These blanks are now available in several of the larger sizes, with formed clearance angles, RH or LH, and in all standard grades of Kennametal. Complete tools of various



styles—straight edge, lead angle, offset, etc., can now be furnished with the screwed-on tips, or separate standard blanks will be supplied to those who wish to make their own tools. Blanks of non-standard shapes and sizes having this feature may also be had for special tools, such as are used in shell turning, form cutting of radii and grooves, etc.

The advantages claimed are:

Greater durability in use, and in grinding.

More consistent performance. A positive mechanical fastening displaces uncertain brazed joints.

Opportunity of heat treating shanks to withstand the pressure of heavy cutting.

Simplified fastening. Only one removable element—a cap screw.

Removability of tip permits independent grinding of shank.

Streamlined design with no projection beyond shank cross-section.

Minimized stock requirements, as tips of different Kennametal grades can be interchanged in the same shank.

Simplified tool making, as most shops are better equipped to drill and tap holes than to braze joints properly.

New Car Puller

American Engineering Company, Philadelphia, manufacturers of Lo-Hed Electric Hoists, announces the introduction of their new Class 2½ Lo-Hed Car Puller—called the "One Man Gang."

The Lo-Hed Car Puller has the barrel, gear box and motor integrated in a single, streamlined unit. Starting line pull is said to be 5,000 lbs., using a single line, or more with various block combinations.

Dimensions, features and applications for the Lo-Hed Car Puller are presented in a folder just released, and available by writing to the company at Philadelphia 25, Pa.

CATALOGS AND BULLETINS

COUPLINGS. *Link-Belt Company*, 307 N. Michigan Avenue, Chicago, Ill. A new, 8-page, illustrated book No. 2045, on a complete line of shaft couplings. Sizes, dimensions and list prices are given for couplings of flexible, rigid flanged face and compression types, with special emphasis on the Type "RC" Roller Chain Coupling. Detailed information is also given on protective casings for the "RC" coupling. A copy may be obtained by writing direct to company.

SAFETY CLOTHING. *American Optical Company*. Southbridge, Mass. A new booklet listing and describing AO safety clothing for male welders. Copies of the booklet can be secured without cost by writing the concern at Southbridge, Mass. Clothing described includes overalls, all-leather pants, hot weather pants, chaps, aprons, coats, cape sleeves and bib, short jacket, sleeves and sleevelets, gloves, mittens and spats.

MOTORS. Crocker-Wheeler Division of *Joshua Hendy Iron Works* at Ampere, N. J. A new protected type motor, designed for both drip-proof and open motor applications, is illustrated and described in a new four-page bulletin. Copies may be obtained by writing to the company.

RUBBER GLOVES. *The B. F. Goodrich Company*, Akron, Ohio. A new catalog section on its all-synthetic industrial rubber gloves has been published and is now available upon request.

COAL CRUSHERS. *The Jeffrey Mfg. Co.*, Columbus 16, Ohio, has a new 40-page Catalog No. 784 covering its complete line of crushing equipment for all mines and industries using coal. Shows types, sizes, capacities, space required and the complete range of product sizes. A copy may be had upon request.

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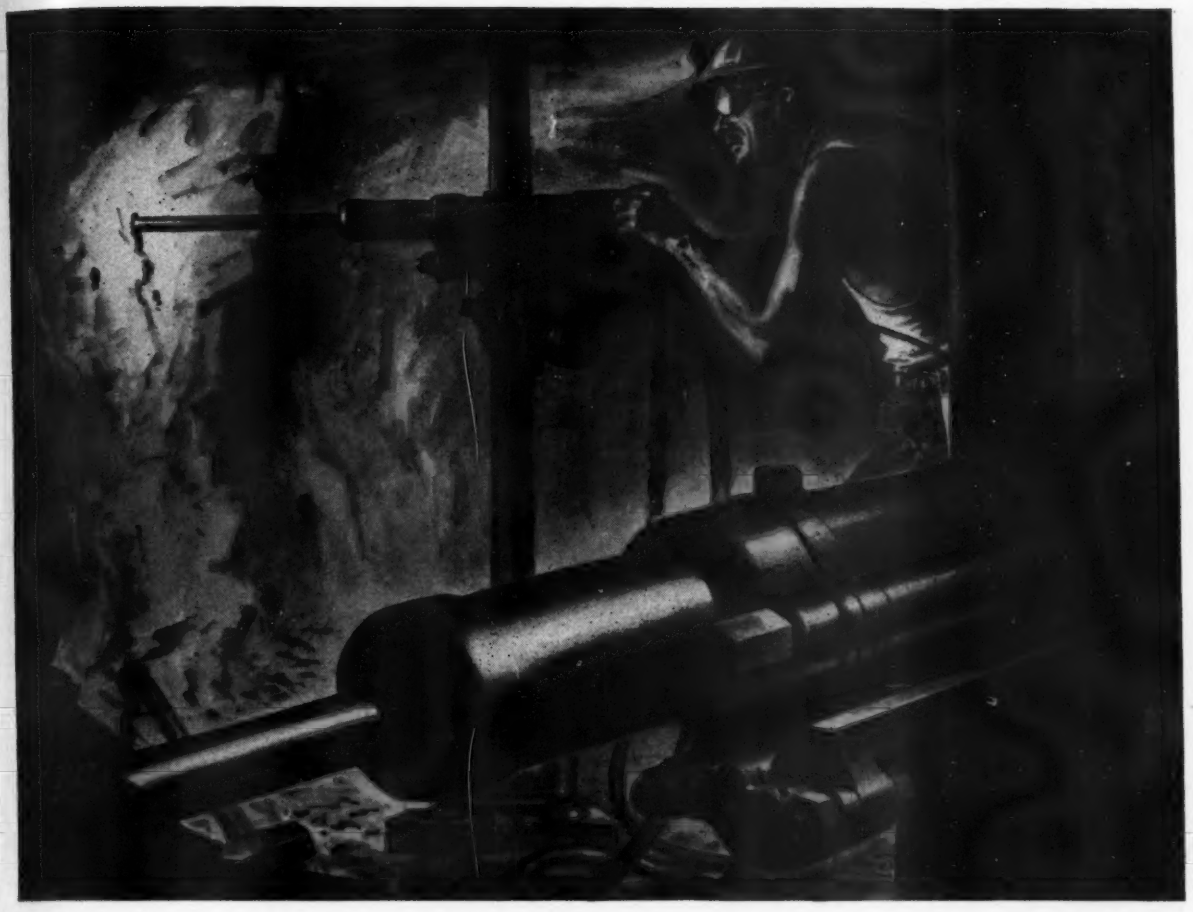
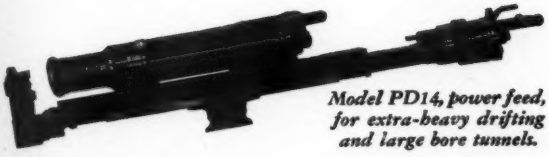


For *FASTER ROUNDS*, shift after shift, use *CLEVELAND DRIFTERS*



Model PD14, power feed, for extra-heavy drifting and large bore tunnels.

STREAMLINED drillers, extremely strong in rotation and hole blowing, Cleveland Drifters are available in 3", 3½" and 4" sizes, either crank fed or power feed. Guide shells have ample feed travel for all standard steel changes, and are of *one piece* construction. This means no standard rods to work loose, easier cranking and less feed screw wear. The "end-seating" valves improve with use. Both chuck nut and spacer bushing *are easily removed in your own shop. Four* strong pawls with extra long bearings insure greater pawl life.

More reasons why Cleveland Drifters are better: 1. HONING of cylinders for lasting efficiency and less wear. 2. GRINDING of flutes on hammers and rifle bars reduces friction. 3. SPLINED CHUCK JAW takes 14 different positions in relation to chuck bushing, lengthening the life of the latter. 4. OIL CHANNELS IN RIFLE BAR insure proper lubrication of this important part. 5. PENTRATING prevents rust. 6. HEAT TREATING "armor plates" parts against breakage from fatigue or shock. *For complete information ask for Bulletin 127.*

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